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ABSTRACT

The intent of this publication is to provide an opportunity for educators to consider reading comprehension as dependent, at least in part, on specific features of written language. Chapter 1 discusses a theoretical framework for thinking, problem solving, and reading comprehension. Chapter 2 deals with teaching word-level comprehension, presenting a nine-level taxonomy of word-level relationships and techniques for teaching words at each level. Chapter 3 offers ideas about sentence comprehension for reading teachers to consider. Chapter 4 deals with the comprehension of passages by asking readers to consider three questions and their possible answers--"Comprehension of what, for what purpose, and how much is required?" (RL)

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READING COMPREHENSION

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Bulletin No. 9511

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In the past, reading comprehension has been presented variously as involving a heirarchy of discrete skills or as a more global process closely related to general thinking and problem-solving. Much less attention has been directed toward understanding reading comprehension as a process directly related to the presentation of written language. The intent of this publication is to provide an opportunity for educators to consider reading comprehension as dependent, at least in part, on specific features of written language.

The publication contains four chapters. In Chapter 1, P. David Pearson discusses a theoretical framework for thinking, problem-solving and finally, reading comprehension. Chapter 2 deals with teaching word level comprehension. Dale Johnson presents a nine-level taxonomy of word level relations and techniques for teaching words at each level. Richard J. Smith, in Chapter 3, presents ideas about sentence comprehension for teachers of reading to consider. In Chapter 4, Eugene Cramer deals with the comprehension of passages by asking readers to consider three questions and possible answers, "Comprehension of what, for what purpose and how much is required?"

Eunice Bethke, Ph.D.

CHAPTER 1
The Nature of Comprehension

P. David Pearson, Ph.D.

Reading is often referred to as a complex cognitive process. In fact, Edmund Burke Huey, in 1908, believed that if we could understand reading we would understand the mysteries of the human mind. Edward Thorndike, in 1918, wrote an article entitled, "Reading as Reasoning..." David Russell, in 1948, considered reading to be an application of basic cognitive processes. The most recent influence on understanding reading comes from the academic disciplines of cognitive psychology and artificial intelligence (computer simulation of cognitive processes). In these recent works (e.g., Anderson, 1977), reading comprehension is viewed as a process subject to the same constraints as human memory and problem solving processes.

It is not difficult to see why so many scholars and lay persons have thought of reading—especially reading comprehension—as a reflection of the inner workings of the human mind. Reading comprehension seems to involve language, motivation, perception, concept development, the whole of experience itself. It seems to be subject to the same constraints as thinking, reasoning and problem-solving. The only distinction one might want to make is in the source of input for the cognitive processing. When we perceive an event and react to it, the source of stimulation for our perception and our reaction is direct and immediate. If we see the house is on fire, we get out as fast as we can. If we do not perceive the fire but hear someone tell us the house is on fire, we are forced to react to a symbolic stimulus (i.e., the sentences we hear) whose meaning is familiar to us; but our actions are likely to be similar. And when we read a story (or hear a story) about a house being on fire, we react to another symbolic stimulus (i.e., the words on the page). And we are able to understand the scenario and to anticipate the occurence of certain actions (e.g., escape) because of our accumulated experience about fires and what people do when they encounter fires.

In short, it is not surprising for us to tell you that many experts think of reading comprehension as similar to other kinds of human behavior. In fact, most of us would reject the argument that we have separate mental entities for processing and comprehending information received by reading (as opposed to listening or experiencing). Intuitively, we believe that the human mind is built as economically as possible (religious or not, we believe that God (or Nature) operates on a principle of economy of effort). Hence, we might be convinced that the mind has special (perceptors) or processes for recognizing print, but we would be skeptical of any "comprehendors" specifically suited to information gathered by reading the printed page. It just doesn't make good sense!

If our argument is convincing thus far, then you will probably accept this assertion: *Whatever influences general thinking or problem solving ability also influences reading comprehension.* In fact, the purpose of the chapter is, in part, to describe those aspects of human experience that have the greatest effect on thinking, problem solving and reading comprehension. We would add a second assertion: *There are a few factors that influence reading comprehension but not thinking or problem solving.*

The purpose of this chapter is to explain how people think. How our ideas get connected to one another. In so doing it is hoped that we will understand a bit more about how they understand what they read. Later, then we will take up specific instructional issues concerning how to help readers understand better.

Try the following experiment on yourself. Better yet, do it with a group of 5-10 colleagues. For each of the following words, jot down the first one, two, or three words, if any, that come to your mind:

1. dog
2. platypus
3. federal
4. gynecocracy
5. sarcophagus

We have tried this experiment with many groups of teachers and using different words, many groups of children. For the words listed above, some typical associations are:

1. dog: cat, bark, pet, Fido (or any other dog's name), collie, bite, animal
2. platypus: duck-billed, Australia, mammal, eggs
3. federal: government, congress, Madison, Jefferson, states, bureacracy
4. gynecocracy: gynecologist, democracy, women, rule
5. sarcophagus: esophagus, tomb, coffin, mummy, Egypt, crypt

The stimulus words differ drastically in the number and the distribution of associations that they elicit. Everyone usually has an associate for dog, platypus and federal. Less than half an associate for gynecocracy or sarcophagus. For dog, about half the responses are cat, followed by names of particular pet

dogs, and then pet, bark and animal. For federal 30% of the responses are government. Responses tend to be varied for platypus. For gynecocracy and sarcophagus the few responses that are given are offered with little confidence.

What is the point of the experiment? There are several.

First, the nature of the associative responses implies that knowledge for concepts[1] associated with the stimulus words is schematically rather than randomly organized. Each association represents a predictable type of relation to the stimulus.

Class Relations

For example, dogs are related to pets and animals in that dogs belong to the *class* of things called animals and are likely to belong to the *class* of things called pets. Such relations are called *class* relations, implying that the stimulus concept belongs to the *class of things denoted by the associative response.*

Example Relations

Fido and collie are related to dog in that collie, as a category, and Fido, as a particular individual, represent *examples* of dogs. Such relations are designated *example* relations. Notice that class and example relations are reciprocal, at least up to a point. If a dog is a member of the *class* animal, then a dog is an *example*, or an instance, of an animal. Likewise, if a collie is an example of a dog, then any collie is a member of the class of dogs. We say at least to a point because individuals probably do not have examples. Fido might be a collie, in which case Fido is a member of the class collie. But can anything be a member of the class Fido? Assuming that by Fido we mean a particular individual dog—not all dogs with that name—the answer is no.[2]

Property Relations

In addition to the reciprocal *class* and *example* relationships, there is also an important *property* relation: concepts have properties or attributes. Animals ingest food and oxygen; pets are domesticated; dogs bark, have hair and often exhibit loyalty; collies have long shaggy hair; and Fido may have a spot of red hair under its chin. Notice that the *property* relationship interacts with the class relationship. If Fido is a member of the classes collie, dog, pet and animal, then it inherits all the properties of collie, dog, pet and animal by virtue of its various class memberships.

Semantic Maps

This whole set of relationships has been graphically portrayed in what is referred to as a semantic network by Collins and Quillian (1969) and Lindsay and Norman (1972), among others. Such a network consists of nodes and links between nodes (see Figure 1). Nodes represent concepts, and links represent relations between concepts. In Figure 1 the various concepts related to our discussion of dogs is presented. The network can be thought of as an incomplete semantic map for the concept dog.

The whole scheme or semantic map will look a little more like real English if we change a few of the link labels. For example, we can replace the *class* link with a link commonly called *isa* (a compound word built from *is* and *a*). So we can say a dog *isa* pet or *isa* animal. Also, we can replace the *property* link with *has, is* or *does*. For example, a dog *is* loyal, *has* hair, and *does* bark. An animal *does* ingest food or oxygen. Now, the semantic map looks a little more like real English, as depicted in Figure 2. Notice, however, that there is no convenient single verb representation for example. We could say, Dog is exemplified by collie, or, Dog has, as an instance, collie.

Related Concepts

One more connection needs to be discussed. How, for example, should we depict the association between dog and cat or dog and wolf? Somehow our schema should account for the very real fact that in people's minds such words are closely associated. Do we need a new link to account for this fact? No, we don't. We can account for such connections by examining the other relations that dog and cat share with one another. These will always be class (isa) or property (has, is or does) relationships. On the semantic map in Figure 2 cat and dog share the *properties* of having hair, teeth and being carnivorous. They also fit into the generic classes of pet and animal.

Using the Concept Model

If you think back to our original experiment, this mechanism makes sense. If we were to ask you *why* you thought of cat when dog was given as a stimulus word, you would probably say, "Well, because they are both common household pets" or "They're both animals or mammals."

The complimentary question is, "How does one learn to distinguish between dog and cat?" The answer again lies in our conception of classes and properties. Had we made our semantic map sufficiently complete, we would have found that while dog and cat share certain classes and properties, there are other properties that they don't share. Dogs bark but cats meow. Cats climb trees, but dogs don't. Dogs learn tricks but cats do not. Cats are felines but

[1] For the sake of convenience, we will use the words concept and word interchangeably, recognizing, of course, that concepts are the meanings associated with the surface form of the word as it arises in print or speech. While linguists and philosophers would disagree with this interchangeable usage, it seems appropriate here because the whole emphasis of the book is on meaning.

[2] There is a sense in which there can be more than one Fido, even if we are referring to an individual dog. Hays (1976) discusses a *manifestation* link from an individual like Fido to a particular manifestation of Fido, i.e., my memory of the way Fido looked when he got all wet while swimming last night.

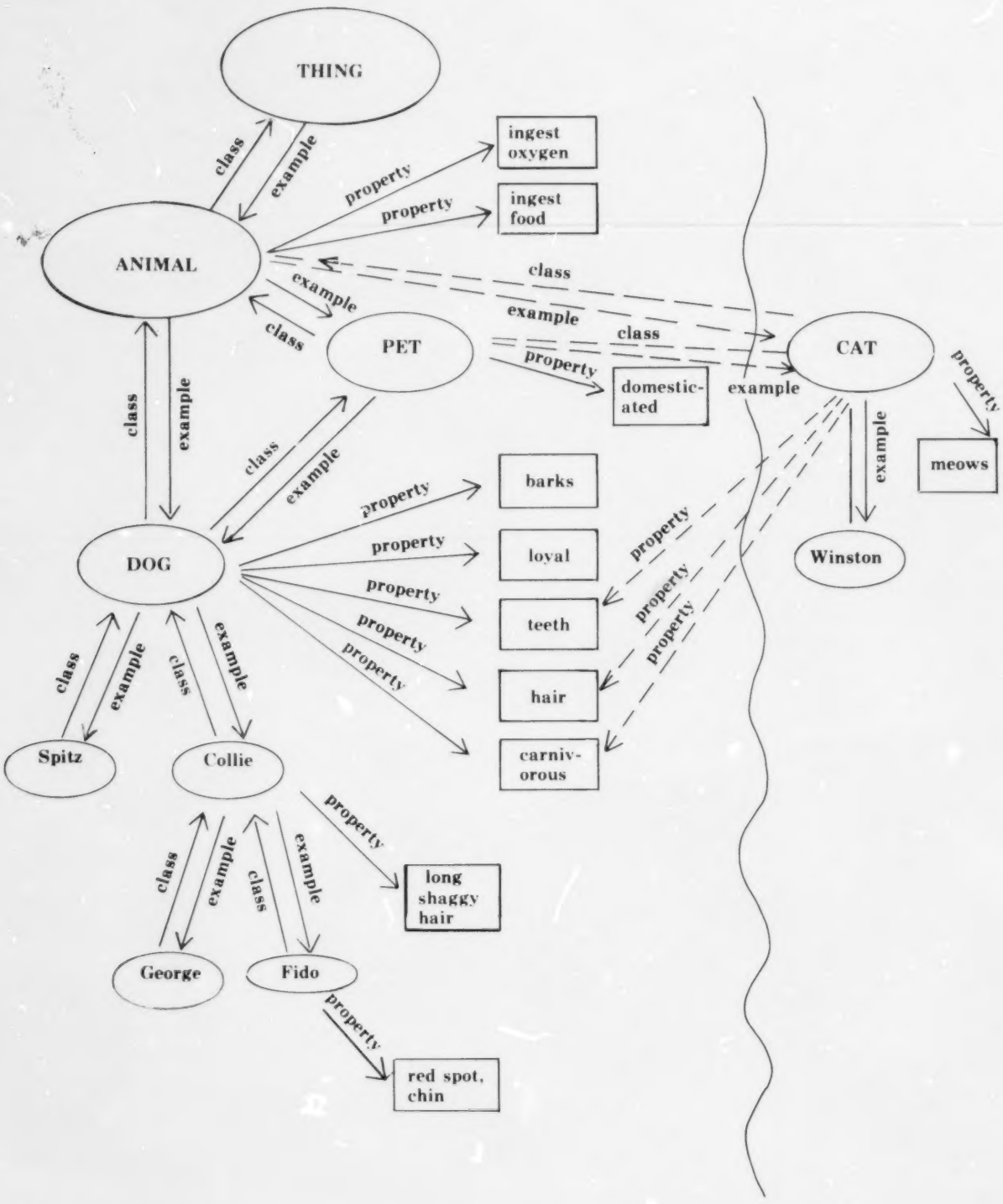


Figure 1: An incomplete semantic network representation of the concept dog and some of its related concepts*

*The network is neither complete nor totally accurate. For example, if mammals were included, as well as some of the subsets of types of mammals, then properties like teeth and hair would appear as properties of these concepts and would be inherited by dogs and cats because of their common class memberships.

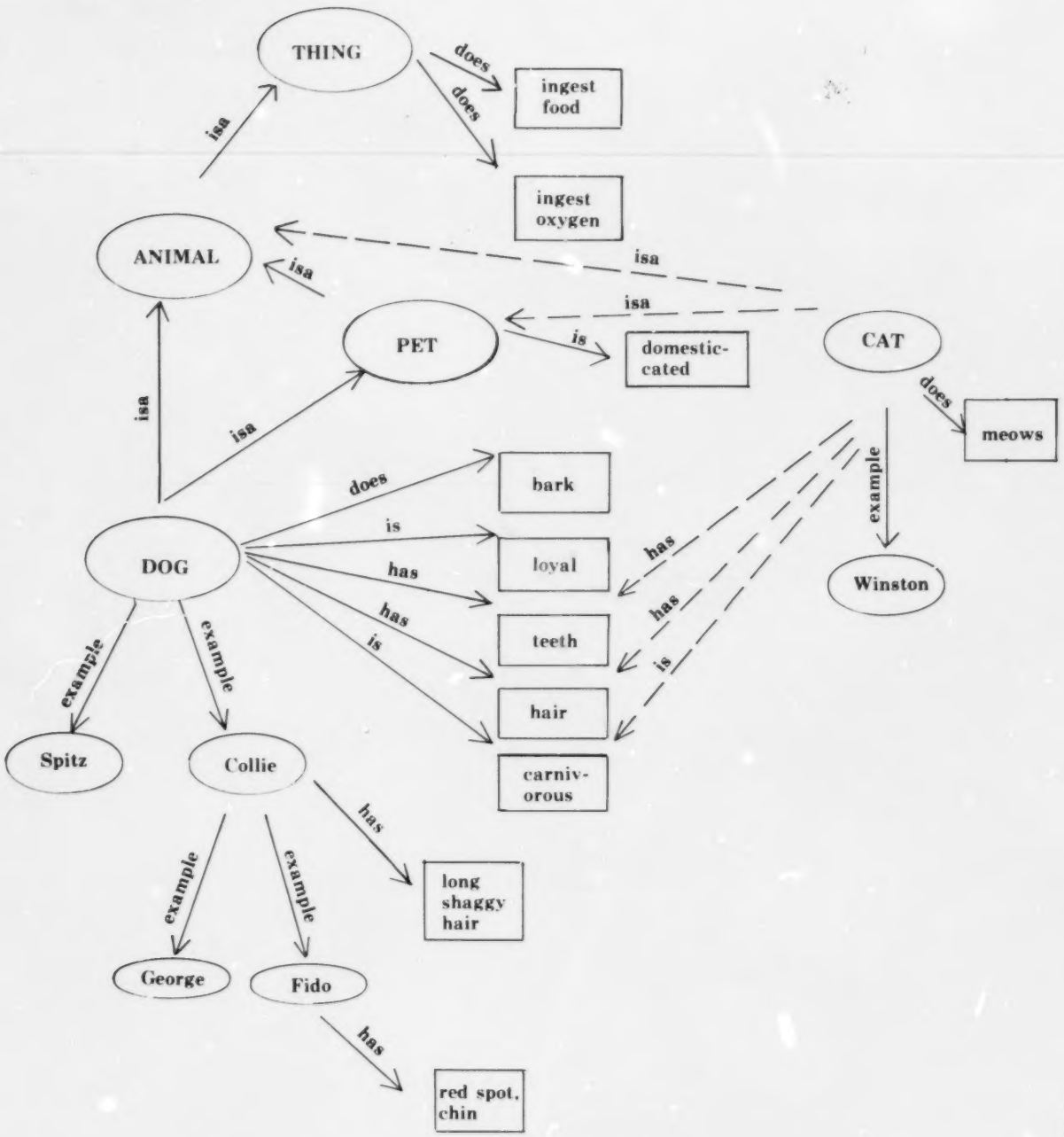


Figure 2: An incomplete semantic network representation of the concept dog and some of its related concepts, using mnemonics to replace class, property and example relationship terms.

dogs are canines. In summary, class and property links capture the character of our intuitive notions about the similarities and differences among concepts.[3]

Now, let's go back to the original experiment. Looking at the sample responses that were given, we should be able to classify each response as a class, example, property or related concept of the stimulus. Let's see if we can.

1. Dog: from our semantic map for dog (Figure 1) we know that animal and pet are classes, Fido and collie are examples and bark is a property. Bite would also be a property.
2. Platypus: if we construct a sketchy map for platypus (Figure 3), we find that mammal is a class and duck-billed Australian resident and eggs are properties.[4]

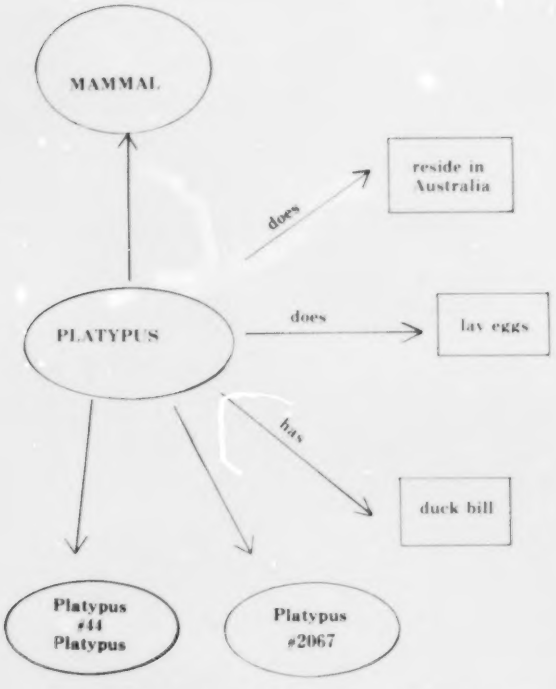


Figure 3: Semantic map of Platypus. (Note: In this and other maps we will use arbitrary numbers to indicate specific instances (examples) of concepts.)

3. Federal: Government is a class (federal government is an example of government). Congress, states and bureaucracy are properties of the U. S. example of federal government. Jefferson and Madison are a bit tougher to handle. They might be classified as properties of the U. S. example of federal government. (The U. S. federal government has the property of having been shaped by Madison and Jefferson, among others). They might be related because both Madison and Jefferson were executives (a property of federal government). But, at least in our semantic maps, they are probably related acoustically (federal sounds like federalist, and Madison and Jefferson were involved in creating the Federalist Papers).

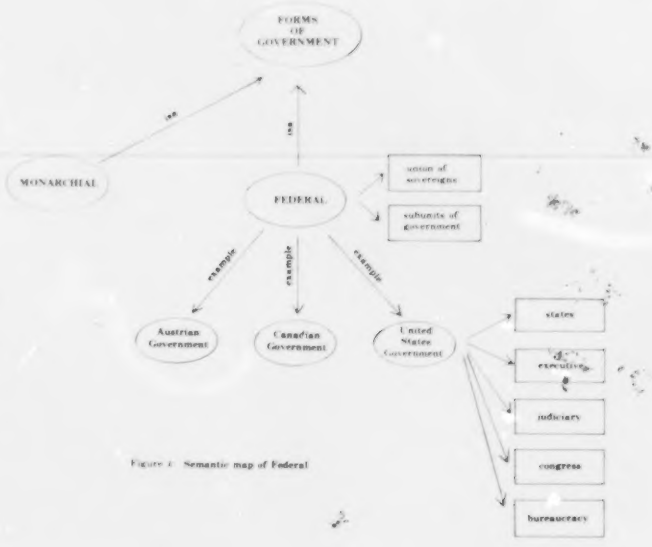


Figure 4: Semantic map of Federal

4. Gynecocracy: Women must be considered an attribute. Rule (types or rule) would be a class relationship. Gynecologist and democracy are related concepts. Democracy is related to gynecocracy through the class relation they share (they are both examples of types of rule); gynecologist, through a property (having to do with women) relation that the two concepts share.
5. Sarcophagus: Coffin is a class relation (a sarcophagus *isa* coffin). Tombs and crypts are related concepts that share an even higher order class relation with both coffin and sarcophagus (all are instruments of interment). Mummy and Egypt are properties of a particular example of sarcophagi (i.e., those in use at that point and place in history). Esophagus is also a related concept (both use the root *phagus*, meaning eating), but in all likelihood

[3] Were we to push this argument from a common sense to a technical level, we would find it difficult—on the basis of easily identifiable physical features—to pinpoint the differences between dogs and cats. There are probably some dogs that meow, climb trees, and don't learn tricks and some cats that bark, can't climb trees and do learn tricks. Yet clearly adults, and even five-year-olds, could unambiguously classify most examples of dogs and cats they encounter. This happens for two reasons. First, it is likely that a whole cluster of features, rather than a single feature, is utilized in concert to aid in discrimination. Second, it is likely that most of our pragmatic, everyday concepts are inaccurate from a technical point of view.

[4] These examples are oversimplified. Australian residence is not a property in the same sense as duck-billed. To do a more accurate semantic map, however, would require formal constructs more complex than are needed to illustrate the basic point. Hence, we will live with a little inaccuracy in order to avoid some unnecessary complexity.

the association in most person's minds is acoustic or graphic (sarcophagus sounds like and looks like esophagus) rather than semantic.

Using Word Association Tasks

Our experiment has side benefit: we can actually use it in instructional settings. It can give us a quick, informal diagnostic picture of what students *already know* and *need to know* about a set of concepts we might want to teach.

For example, take the concept of sarcophagus, for which several students in our hypothetical class had no association whatever. Obviously sarcophagus would require much more of our teaching attention than would dog (for which everyone had some association, and most had cat as an association). However, in the process of asking for association, we did get some key anchor points through which we could approach the meaning of sarcophagus. They are coffin, tomb, Egypt and mummy.

Let us illustrate this point through a discussion which, while hypothetical, is not unlike many we have had while using this technqiue in simulations with groups of teachers.

Instructor: Give me some of your responses to sarcophagus.

Students (composite responses): Coffin? Mummy!, tomb, Egypt! Esophagus? (instructor lists words on chalkboard).

Instructor: Now, how many really had no idea what sarcophagus meant when I asked you for an associate? (reluctantly, some raise hands) O.K., one of you give your idea about what you think sarcophagus means if I tell you that all those words—coffin, tomb, mummy, Egypt—have something to do with a sarcophagus.

Student #1: Well, it's probably some kind of a thing to bury people in.

Student #2: Well, maybe it's the case or coffin that they put mummies into in ancient Egypt. I don't know.

Instructor: Let's ask one of the students who gave mummy as a response. Are they right?

Student #3: More or less. I think a sarcophagus is any kind of coffin made out of stone. So those coffins they put mummies into were probably sarcophagi. But any stone, or maybe even metal, coffin could be called a sarcophagus.

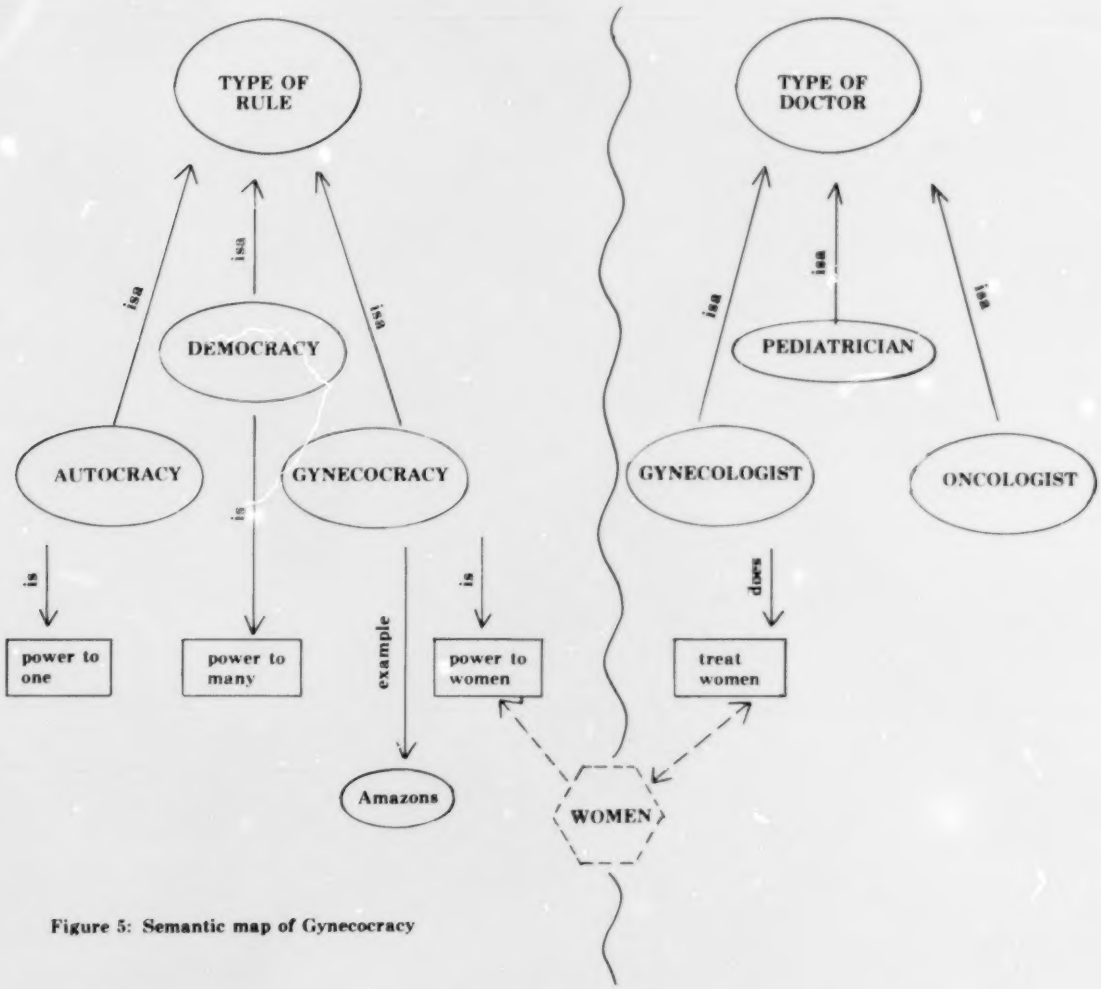


Figure 5: Semantic map of Gynecocracy

Instructor: I looked up sarcophagus in the dictionary and it did say that it was a coffin made out of stone. And in an encyclopedia it said that sarcophagi were used by Egyptians and other ancient peoples too. It also said that George Washington was buried in a sarcophagus.

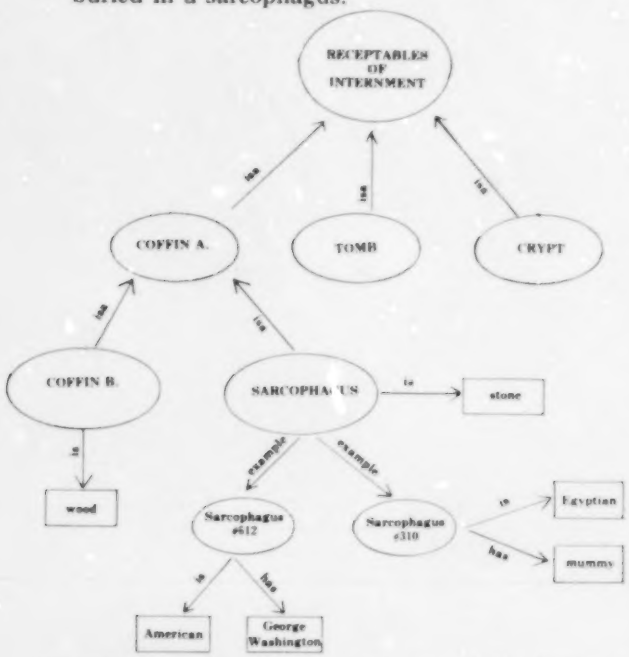


Figure 5. Sketchy semantic map for sarcophagus (Note: the numbers are arbitrary and used only for convenience in distinguishing among examples of different sarcophagi)

The hypothetical discussion illustrates a basic point about our experiment: as long as some of the associative reponses given by the group are real associates of the key concept, the teacher has the experimental base from which to approach that concept.

We assume that the people who give associative responses like coffin, tomb, and mummy possess concepts for those words.[5] Therefore, even if all the students in the hypothetical discussion don't know what a sarcophagus is, at least some of them (and probably all of them) do know what a tomb, a coffin, a mummy, and, maybe, a crypt are. And it is precisely through the known related concepts which students do possess that we ought to approach unfamiliar concepts.

Concept Development and Experience

The discussion also serves to illustrate a more general point about concept development as it relates to comprehension. One of the axioms of instruction for concept development is that there is no substitute for direct experience. If we want children to really know about tigers, then we should take them to a zoo (or better yet to their natural jungle habitat) to observe tigers in action. We will gladly stipulate that direct experiences enhance and enrich children's concepts, but in the same breath we will argue that the realities of classroom instruction make it impossible to rely on direct experience as the major vehicle for concept development.

Our hypothetical discussion implies that there is an alternative approach. Since, in most cases, direct experiences are not possible, teachers should shift their emphasis from the question, "How can I provide direct experiences to help develop this concept?" to the more reasonable question, "Of those concepts related to the concept I want to teach, which ones do the children already possess (and maybe even have a set of direct experiences for)?"

Put differently, it is like admitting that chances are pretty good that the children possess neither the concept in question nor the requisite direct experiences. So, as a teacher you say, "What is it that they do know about that I can use to hang my hat on? What are the anchor points that I can use to access the new concept?"

We like to use a catch-phrase to characterize this fact about comprehension: comprehension consists of *relating the new to the known. You can see how readily the sarcophagus discussion illustrates this point. The notions of tomb, crypt, coffin and mummy were known. They provided the anchor points. What was new* was the label *sarcophagus* and the property *made of stone.* The task that confronted the instructor was to assist the students in assimilating the new information into their pre-existing body of meaning (i.e., that knowledge represented by the semantic map).

Similarly we could demonstrate how gynecologist and democracy could provide the anchor points for accessing gynecocracy, or how mammal, eggs, duck-billed and Australia could provide anchor points for platypus.

To demonstrate to yourself how ubiquitous this practice is, even in our everyday experiences, think back to a situation in which you were trying to explain something to a friend. Probably you started your explanation, "Well, it's sort of like . . . but it's different in that . . ." Thinking back to our semantic map diagrams, what you were trying to do was to find an anchor point in your friend's pre-existing store of information. Then you were trying to identify the critical properties that distinguish the concept s/he already possessed from the one you were trying to explain.

From Words to Sentences and Paragraphs

One of the common complaints about models of comprehension is that they don't work for complex units of language like sentences and paragraphs. What is easy to demonstrate for words may be impossible to demonstrate for sentences or paragraphs. Let's see how our *new to known* notion works with real discourse.

[5]Such an assumption stems from a general principle of language development: comprehension precedes production. In other words, people rarely use a word for which they have no concept (even if their concepts are not accurate according to a dictionary definition).

We'll begin with another experiment. Sit down with a group of colleagues (10 or 12). One of you assume the role of teacher. Let that person ask the question, "What do you know about the Union Pacific Railroad?" What follows is a transcript of a hypothetical discussion sparked by that question (but based upon actual discussions we have held with students).[6]

Instructor: Tell me what you know about the Union Pacific Railroad. (No response.) Well, when was it built? (No response.) Before the Civil War? After? During?

Student #1: Before!

Student #2: After!

Instructor: Now, why do you say before?

Student #1: Just seems right to me. Maybe it had something to do with the Gold Rush?

Student #2: No, it was after!

Instructor: You're sure about that?

Student #2: Pretty sure. There's something about a Golden Spike out west in Utah, or Nevada, or Wyoming, and that country wasn't even settled by the time of the Civil War.

Instructor: Didn't they have railroads before the Civil War?

Student #3: Sure, the railroads came as early as 1820 or 1830. Right after the steam engine.

Student #4: But they were mostly in the Eastern United States.

Instructor: So no one is sure when it was built. Anyone want to guess about a date? (Several are offered ranging from 1849 to 1910.) O.K., where did it start and where did it end? (No responses.) Let me draw a map. (Draws sketchy map of the U.S.) Did it start over here on the East Coast, say Pittsburg? Did it start up here, say Minneapolis? Did it start here, say St. Louis? Where?

Student #4: I think it was St. Joseph. Something started there.

Student #5: Omaha sounds right to me.

Student #3: St. Louis rings a bell for me.

Instructor (who has been jotting down guesses all along): Well, we have three candidates. I'm not sure either. But we'll find out. Where did it end? Here, in Los Angeles? Here, in San Francisco? Here, in Seattle? Here, in Utah? Where?

Student #6: San Francisco, because Los Angeles was just a small town then.

Student #7: I seem to remember that it was not one railroad but two that built the first transcontinental railroad.

Student #8: That's right. It was a contest.

Instructor: So, when the railroad across the country was built it wasn't built from East to West?

Student #8: No, it wasn't! One company started from the East and the other started from the West.

Instructor: I think you're right. The first transcontinental railroad was built from both ends toward the middle. What do you need to build a railroad?

Student #5: Rails.

Student #4: Railroad ties.

Student #1: Workers.

Instructor: O.K. For the company that went from East to West, I can see how they got their materials.

Student #3: Yeah, they just loaded them onto railroad cars and hauled them to the end of the line.

Instructor: But how did they get their materials on the West Coast?

Student #5: Same way.

Student #7: Not then. No iron ore out there. But they could get ties.

Instructor: I think you're right. I think Pittsburg was the center of steel production then. It still is, I guess. Well, let's assume they had to transport rails. How could they do it? Overland stage?

Student #6: No! Rails would have been too heavy for the wagons. And if they only took 1 or 2 it would have taken forever to haul the rails.

Instructor: Pony Express?

Student #6: No! By boat.

Instructor (pointing to map): You mean they went from Pittsburg to New York then around through the Panama Canal and up to San Francisco? (Lots of no's) Why not, that's about the shortest way.

Student #3: Panama Canal wasn't built yet. They had to go around South America.

Instructor: How do you know that? We haven't even established when the railroad was built. Maybe the Panama Canal was already finished.

Student #4: No!

Instructor: Did they have to go from Pittsburg to New York to get a ship? Could they have gone another way?

Student #5: Maybe they went by barge down the Ohio River to the Mississippi, then to New Orleans.

Instructor: Could they? Does the Ohio River go through Pittsburg?

Student #6: I'm not sure but I bet some river did that eventually went into the Mississippi.

Instructor: What about the ties? Do you think they just got those out in California and Nevada as they went along? Or do you think they hauled those from the Midwest or the East?

Student #7: There's lots of timber in California, in the mountains.

Instructor: But is it the right kind? Can you make ties out of redwood or pine or fir?

Student #4: You could probably use fir, but not redwood or pine. They're too soft.

Instructor: I'm not sure myself. As a matter of fact, I'm not sure about much of this at all. Let's just review what we're not sure about at this point. (Instructor jots down the following points) When was it built? Where did it start? Where did it end? Where and how did they get the rails and ties? Oh, one other thing—who were the workers?

[6] I am indebted to my colleague Dorsey Hammond from Oakland University for the Union Pacific example. He, I believe, is in turn indebted to Russell Stauffer.

Student #9: Coolies. Chinese coolies.

Student #7: On the West Coast. But from the East it was the Irish.

Instructor: Why the Irish and the Chinese?

Student #9: They brought in the Chinese just to work on the railroad because they were cheap.

Student #7: The Irish were new immigrants. They were cheap, too. It was the only kind of job they could get. They were discriminated against then.

Instructor: That's one more thing to look for—who built the railroad? And there's one other thing that's always puzzled me. Why did they build it from both ends toward the middle? It would seem to me to make more sense just to go from the East to West. Then they wouldn't have had to worry about transporting materials by boat or whatever. Well, that's enough to look for. Here's an article about the railroad. Let's read it to see whether or not we were right about any of this.

George Bernard Shaw allegedly said that every time he picked up a new book the first thing he did was to construct a table of contents for it. Then he read the book to see what the author had left out. Not all of us are Shaws. But the point is clear: comprehension of any new material is facilitated when the reader knows what s/he already knows about the topic in question. Put another way, comprehension is facilitated when we approach what is new from what is already known.

Citing another of our favorite literary characters, Charlie Brown, what we want students to avoid is what we call the Charlie Brown syndrome. Recall what Charlie Brown does whenever he gets a new book. Before he even looks at the book, he counts the pages. (624 pages! I'll never learn all that!) He's defeated before he starts, before he has had a chance to realize that he doesn't have to learn *all* that. It's not *all* new. He already knows something about it. He hasn't given himself the chance to learn what it is he *already* knows about what he is *supposed to know*.

We fear that all too many students approach school subjects with the Charlie Brown syndrome. They start out believing, "It's all Greek to me!" That isn't true! Chances are pretty good that they already know something about most topics they encounter in school. They just don't realize it. Indeed, one of the teacher's most important tasks is to help students make that connection between what they already know and what they need to know.

A Formalism for Comprehension of Longer Discourse

Thus far we have offered some common sense arguments to demonstrate that comprehension for longer discourse can be conceptualized in the same way as concept development for words. But the metaphor is rough. About all the two treatments have in common is the *New to Known* principle. We have yet to offer anything like the formalism of a semantic network or map we used for capturing relations among words.

While the details are not quite so well worked out, there are some useful frameworks that represent attempts to capture the structure readers bring to the printed pages as they try to make sense out of all those little squiggles. Interestingly, the frameworks that make the most sense to us come out of a discipline totally alien to both of us--computer simulation of intelligent behavior. We have been most influenced by the work of Minsky (1975), Schank (1973) and Lehnert (1975) in constructing our own framework for comprehension of longer discourse.

At the risk of alienating you with examples, read the following paragraph, and answer the questions following it.

> John went to Vescio's, his favorite Italian restaurant. He ordered lasagna. When the waiter brought it, John was so enraged that he left without leaving a tip. He even forgot his umbrella.
>
> 1. Where did John go?
> 2. Why did John go to Vescio's?
> 3. Why did John fail to leave a tip?
> 4. Why was John angry?
> 5. Did John pay for the meal?
> 6. Why did John forget his umbrella?
> 7. Had it been raining that day?
> 8. Does John like Italian food?
> 9. Who seated John at his table?
> 10. When did John pay for his meal?

You should recognize questions #1 and #3 as what most people refer to as literal comprehension. The text states very clearly that John went to *Vescio's* and that he didn't leave a *tip because he was so enraged*. The rest of the answers are a bit trickier; however, we would wager that you could give a plausible answer for each of them. For example:

2. to eat (Italian food).
4. probably something was wrong with the lasagna or else the waiter did something strange.
5. apparently he did, otherwise the author would have mentioned it.
6. because he was so angry.
7. probably. Or else it looked like rain when John started out to the restaurant.
8. he must; otherwise he wouldn't have a *favorite* Italian restaurant.
9. a hostess or a maitre de, since Vescio's has waiters they probably have a *maitre de*.
10. probably on his way out.

On what basis could you generate such responses? There is little in the text to definitely support any of the responses except #6, and even that is open to

question. Most of us agree that we generate such responses on the basis of the experiences we have had, in this case with restaurants. It is almost as though each of us carries around a set of rules or generalizations about our world. They might be something like:

A. People fail to leave tips when they receive either poor food or poor service or both.

B. People go into restaurants to eat, among other things.

C. People carry umbrellas when it is raining or when they think it is going to rain.

D. Restaurants with waiters tend to have a maitre de.

E. If a person becomes so angry with the food or service that s/he fails to leave a tip, s/he may pay the cashier on the way out rather than dealing with the waiter.

Thinking back to the questions and answers about the restaurant, we would hardly want to label literal the kind of comprehension required by these questions. Most of us would agree that they are inferences based upon experience—that we have chosen to represent in the form of a set of generalizations.

Experience is at the heart of comprehension, especially as comprehension is assessed in today's schools. Experience is what we are referring to when we say that a person is good at reading "between the lines".

Because we have found his treatment of the relationship between what is *in* text and what the reader brings to the text so useful, we have adopted Schank's term, *script*, as a special label for experience (at least most experience).

A bit of history about attempts to get computers to act like human beings will help to clarify the usefulness of the script notion. People in a field called artifical intelligence (AI) have been trying for at least two decades to get computers to act like human beings.

In the early program for question answering, computers could answer questions like #1 and #3, but none of the others. That is because a computer will only give back to you what you put into it. In our little story only questions #1 and #3 have explicitly stated answers. The rest require inferences. Human beings have little trouble making such inferences. AI researchers literally had to feed the computer all that extra information that humans carry around in their heads. So for a short paragraph like our example, they had to feed in about 5 to 6 times that much information just so the computer could answer questions like the ones we posed for our restaurant paragraph.

It became obvious that a more efficient procedure had to be devised. Several computer scientists came up with standarized, stereotyped frameworks called frames or scripts. (We will use the term script.) A script was used to represent all the mundane, taken-for-granted knowledge that an information-processor (be it a computer or a human) brings to a real life situation (like going to a restaurant) or to a comprehension situation (reading or listening about going to a restaurant). Schank and his colleagues, for example, developed a restaurant script, a bus ride script, a subway script, etc. Then whenever the computer encountered a story dealing with a particular instance of going to a restaurant or riding a bus, it called up the appropriate script. This procedure has made for much more efficient computer programs, especially those that try to answer questions.

But more important for our purposes as educators, computer scientists have provided us with a useful metaphor for conceptualizing the way in which living information-processors (students) answer questions about what they read (and what they already know about what they read).

For a second, consider the wealth of knowledge that you brought to bear on that paragraph about John in Vescio's. What did you already know about going to restaurants? What was your restaurant script?

First, you knew that there is an entrance scene, a being-seated scene, an ordering scene, an eating scene, a paying-the-check scene, a leaving scene. Furthermore, you also knew that each of those scenes has more-or-less predictable sub-sequences, e.g., menus arrive before the order is placed, you pay the check before you leave the tip.

Second, you brought a great deal of knowledge that could be labelled "plausible explanations". Had the text indicated that John left an extra large tip, you would have inferred that either the service or the food was extra good, or that John was trying to impress someone eating with him. These plausible explanations probably take the form of generalizations about your restaurant "world" not unlike those generalizations listed above.

Most script knowledge is very mundane, almost taken-for-granted. In fact, if a writer or a speaker, in relating an instance of going to a restaurant, included all those mundane details, you would probably become bored, impatient, irritated or concerned about his/her intelligence. You already knew that! What gets into a text—oral or written—is what is special or unusual. You should have seen the way Hortense ordered and tasted the wine! She was class, all the way! Or, the duck ala orange was horrid! Overcooked and tough (you expected otherwise)!

Using the script metaphor, we believe that comprehension involves (1) processing the text information, (2) matching it against the prototypic script for such events, and (3) integrating textual and scriptal information, thus producing a *complete* knowledge structure for the event described in the text.

If you think about these steps in relationship to our discussion of concepts and semantic maps, you'll see remarkable similarity. Matching against a prototypic script is very much like finding a class to which a concept belongs. Integrating textual and scriptal information is akin to pinpointing those properties of a concept, say Fido, that makes it like all examples of its class, say dogs, as well as those properties which distinguish it from all other dogs. Especially with descriptions of events, it is as if we are saying to ourselves what is it that makes this event (say the Vescio's scene) like our prototype for this type of event (our restaurant script) and what is it that makes this event unique?

A Developmental Look at Scripts and Concepts

Since scripts are built from experience, it is painfully obvious that they are dynamic—everchanging. The relationship between our scriptal protoypes and particular instances of scriptal events is reciprocal. Surely we use our scriptal knowledge to help us interpret an event, just as we did in order to answer the questions about the Vescio's scene. However, each encounter we have with a particular instance must alter our scriptal prototype in some way. John's restaurant script will never be quite the same after the Vescio's incident. And because we have read about John's misfortune, our restaurant script is probably altered, too.

Memory and New Information

At some point in your professional education it is likely that you were required to read or read about Piaget's work in developmental psychology. You may even recall the terms schema, assimilation and accommodation. Piaget has postulated that concepts are stored in people's minds in schemata (plural of schema). A schema is not unlike our semantic maps (or segments of them). For example we might have a dog schema that we use to cluster the memory representation of all the types and examples of dogs we have encountered. Likewise we might have cat, wolf and animal schemata. Assimilation occurs when we are able to categorize a new example as belonging to a pre-existing schema." Oh, there's another cat." In assimilation our schema are not substantially changed. Accommodation occurs when we have to alter our schema or schemata. For example, assume that a four-year-old has a schema for animal that includes all four-legged mammals (this, by the way, is the schema that many four-year-olds do possess). Then s/he encounters a cricket. You, being the resourceful teacher that you are, say, "Oh that's a cricket. It's the kind of animal we call an insect. It has six legs and three body parts."Now the child does one of three things: (1) s/he can choose to ignore the information you have provided and keep his/her schema intact, (2) s/he can choose to modify his/her animal schema to include small six-legged creatures as well as larger four-legged creatures, (3) s/he can keep his/her original animal schema intact and postulate a second work sense (meaning) for animal: "Oh, animal must mean all creatures that move around on their own *as well as* all those four-legged things I know about."

In the first situation the child has assimilated by ignoring your information. His/her animal schema is intact. Accommodation has occurred in both the second and third situations. In the second, the child has altered the properties that s/he assigns the concept animal. In the third instance, s/he has kept the original schema intact and added a new schema for the same label, animal.

The issue of accuracy is not really relevant in concept development. Granted, we want students of all ages to have accurate concepts. However, students will develop concepts whether they are accurate or not. Toddlers are famous for this. Their initial concept of cat may include squirrels, dogs, horses and rabbits. And it is only through the processes of feedback (No! that's not a cat, it's a horse) and instruction (Cats are little, they purr and climb trees) that children learn to order their world as we adults do.

Scripts are subject to the same set of operations, i.e., assimilation and accommodation. Suppose that Henry, a sheltered teenager from a well-to-do family in suburbia, has spent his restaurant life in elegant French restaurants and chic bistros. His restaurant script contains all the elements and events most of us associate with "good" restaurants. Then, at age 14, his parents allow him to go to MacDonald's with some friends. His restaurant script is upset! You pay for the food *before* you get it! No *maitre de!* Standing in line! Food served in paper containers!

When Henry encounters this deviant information, he has three choices. (1) He can ignore the information about MacDonald's altogether, perhaps claiming that MacDonald's is not a restaurant at all; in this case his restaurant script remains intact. (2) He can modify his restaurant script to *accommodate* the new information; in this case, he must change some of his restaurant script rules, e.g., you can pay for the food either before or after you get it, or, (3) He can create a new script for fast-food restaurants which he keeps separate from his "good" restaurant script.

The choices are analogous to those for the four-year-old and his/her cricket information. But only choices 2 and 3 are of any real use to Henry assuming that he will encounter other "MacDonald's" in his life (an inevitability), only the modification of his old script or the creation of a new one will allow him to deal with that new information.

Summary

The basic purpose of this chapter has been to convince you that comprehension is a complex but understandable process. Comprehension is best understood by invoking the *New to Known* principle. We understand what is *new* in the context of what is already *known* to us.

To the degree that new information "fits" into pre-existing schemata we have *assimilated* the new infor-

mation. When that new information does not fit, we can ignore it (as we often do to preserve stereotypes), or we can modify our schemata to *accommodate* that new information.

Much of our knowledge of "words" can be thought of as being stored in *concept maps*. These maps represent the kinds of knowledge units we store plus the linkages, or relations, between knowledge units. There are four important relations: *class*—a dog *isa* mammal; *example*—dog is exemplified by collie; *attribute*—dogs *have* ears, they *do* bark and they *are* loyal; and *related concepts;* cats share certain attributes and class relations with dogs, but differ in others. By thinking about the various relations of a concept, we can plan strategies for relating what is *new* to what is *known;* that is, we can find anchor points for assessing the new. Thus our reliance on direct experiences can be lessened.

The notions of scripts are similar to concepts, except that they apply to larger units of discourse and to events in the world. Otherwise, our knowledge of events acts much like our knowledge of concepts. We sometimes *assimilate* new information into existing scripts; we sometimes *accommodate* that new information by revising a script. The point to be made regarding prior knowledge is that it is important to help students to realize what they already know about a topic before they read about it because they don't always "know" what they know about it. Such strategies tend to reduce the incidence of "It's all Greek to me" and the "Charlie Brown" syndromes, syndromes which block students' understanding of new material.

CHAPTER 2
Comprehension of Words

Dale P. Johnson, Ph. D.

There are two reasons for beginning a discussion of comprehension tasks with word level comprehension. First, words are important to comprehension. Many researchers have demonstrated the importance of vocabulary knowledge (word meanings) as a component of comprehension. Second, word level comprehension is more straightforward than sentence level comprehension. By beginning with the word, we hope to establish some clear patterns of relations among ideas that will apply to sentences and paragraphs as well.

We have selected nine word level relations in our taxonomy. They fall in three categories, as listed in the chart in Figure 1.

Simple Associations

Synonyms

Is it possible for two words to be truly synonymous? Compare, for example, the pairs big-large and walk-stroll. Somehow big and large appear to be more alike in meaning than walk and stroll. So synonym pairs differ in terms of their degree of snyonymy. There is a point of view suggesting that no two words are exactly synonymous; if they were, one word would drop out of the language. Such a view assumes that languages are optimally economical; that is, there are no redundant words. Words which appear to be synonymous really elicit *shades* of interpretation. For many alleged snynonyms this is true, as we will see when we talk

Figure 1: Word Level Comprehension

Category	Relation	Examples	Task
A. Simple Associations	1. synonymous (synonyms)	assist-help	Recognizes that two words have similar meanings.
	2. antonomous (antonyms)	help-hinder	Recognizes that two words can have opposing meanings.
	3. associative (associations)	green-grass run-fast walk-slow	Recognizes that pairs of words often co-occur in the language (often the words are linked by an attribute relation).
B. Complex Associations	4. classifactory (classes)	animal-dog cat horse	Recognizes that a class label has various examples that belong to that class.
	5. analogous (analogies)	dog is to bark as cat is to meow	Recognizes that two pairs of words can be related in a similar way.
	6. connotative/ denotative	I strolled down walked the sauntered street	Recognizes that words that denote the same class of things, or behaviors connote different meanings or feelings.
C. Ambiguous Words	7. multiple meanings	fly-to soar fly-an insect	Recognizes that a given label can refer to different concepts (i.e. have different meanings).
	8. homographic (homographs)	proJECT—PROject	Recognizes that words alike in spelling can differ in pronunciation and meaning.
	9. homophonous (homophones)	fair—fare	Recognizes that words alike in sound differ in spelling and meaning.

about the whole denotation/connotation issue. Perhaps what we want students to learn when we ask them to complete synonym exercises is to recognize the *similarity* not the *identity* of two words.

We believe, especially for younger students, that synonym activities are very important. And we are willing to postpone *shades* of interpretation instruction until sometime in the intermediate grades. Here are several types of synonym activities we and our colleagues have found useful.

1. Circle the word that means the same as the key word.

   big-small large hope

2. Circle the word that means the same as the word in the sentence.

   Joan has a big bike

   small large hope

3. Draw lines between words that mean the same.

big	bicycle
little	large
run	race
bike	small

4. Have students rank synonyms on a given feature (attribute) such as size, strength, intensity or approval. Some sample lists for this activity might be:

stream	loathe
brook	abhore
creek	dislike
river	hate
rivulet	despise
ailment	afraid
poor health	panicky
illness	terrified
sickness	scared
disease	frightened
astound	love
astonish	like
flabbergast	adore
surprise	admire
startle	tolerate

(Note: this activity carries over into the connotative/denotative task. Grade 4 or 5 is probably a good time to start such activities.)

5. Once antonyms and associates have been introduced, the following type of activity can be used to practice all three tasks at once. Classify each pair of words as about the same in meaning, opposite in meaning, words that "go together" (you would likely find them together in the same sentence), and words that are *not* at all related.

Pair	Same	Opposite	Go Together	Not Related
big-large	X			
hot-cold		X		
green-grass			X	
guitar-north				X
redwood-elect				
happy-sad				
run-ever				
afraid-scared				

(Note: this activity can be used as low as Grade 3. If you use just same and opposite, it can be used even lower. You have to be liberal in your scoring of "go together" words.)

Antonyms

Like synonyms, antonyms are not as simple a matter as most of us might want to believe. Unlike synonyms, there probably are real antonyms—words truly opposite in meaning. The problem is that there are many kinds of "opposition".

For example, one kind of opposition is called contradiction. If a thing is *true* then it cannot be partly *false*. You are either *in* or *out*. You *agree* or you *disagree*. You are *alive* or you are *dead*. A diamond is *perfect* or it is *imperfect*. A thing can be near perfection; but if it is not there, it is not perfect. The terms are what logicians call mutually exclusive. There are not too many such antonyms. Besides the pairs that have been mentioned, a few that come to mind are *right-wrong, complete-incomplete, finished-unfinished, correct-incorrect*. One note about contradictory terms. In common usage, we often talk about something being *partially correct, half-finished, half-dead*, or *partly true*. Such modifiers do not change the picture. A half dead horse is still *alive*. A *partly true* statement is still *false*. A *half-finished* project is *unfinished*.

Contradictory pairs differ from *contrary* pairs, another term borrowed from the logicians. They may be thought of as true diametrical opposites. For example, *hot* and *cold* lie at precisely the same point on opposite ends of a heat continuum, equidistant from some midpoint that is neither *hot* nor *cold*. *Warm* and cool are not at the extremes, but we probably think of them as equidistant from that same midpoint. Unlike contradictory terms, contrary terms allow for a range of values in between. *Good* and *bad* are extremes on a quality continuum with many values in between, including *fair, mediocre* and *poor* in between. There are a fair number of these *contrary* pairs.

white-black	heavy-light
dark-light	shy-bold
empty-full	fat-thin
loud-soft	prodigal-parsimonious
love-hate	deep-shallow
sharp-dull	noisy-quiet
superior-inferior	wet-dry
easy-difficult	fast-slow
happy-sad	

A third category of antonyms might be called *reverse* terms; one term is more or less the undoing of the other. There are many clear examples:

admit-reject, constructive-destructive, build-raze, go-stop, alleviate-aggravate, fear-hope, help-hinder, aboveboard-underhand, arrive-leave, go-come, analyze-synthesize.

A fourth type of antonomy might be called counterparts. Some are what logicians call *relative* pairs, pairs where one term implies that the other also exists: *parent-child, send-receive, husband-wife, predecessor-successor, employee-employer, renter-rentor* or *seller-buyer.* Other counterpart terms denote pairs where the two words are alike in all aspects but one: *brother-sister, mother-father, aunt-uncle, actor-actress.* Still others are *complementary* terms; when you encounter one, you expect to encounter the other or you expect that the other has or will occur. They are, in a sense, *reciprocal.* For example, an *answer* implies a *question.* If one party *attacks,* another *defends. Stimuli* elicit *responses.* If one *gives,* another *takes.*

The last category is usually called *contrasted* terms. It hides a multitude of sins; that is, it includes many terms that do not really clash with one another in the way that contradictory or contrary terms do. Here are some examples:

top-bottom	quell-foment
floor-ceiling	relative-absolute
stop-start	religions-secular
awake-asleep	begin-end
cloudy-sunny	keep-abandon
raw-ripe	open-close
relaxed-stiff	rational-irrational
night-day	strict-lenient
morning-evening	land-revile
heaven-hell	

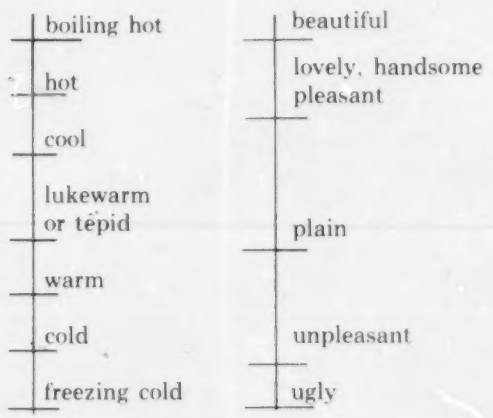
In the strict sense, only contradictory, contrary and reverse terms are true opposites. However, there are so many other terms that are contrasted on some feature that we think all the categories should be included in instructional activities for antonyms.

You may feel as though we have dwelt too long on this topic and made some unnecessarily fine distinctions. There are three reasons for going into such detail on antonyms. First, all of us have intuitively recognized these distinctions among antonyms. We know that *hot* is not the opposite of *cold* in the same way that *husband* is the opposite of *wife* or *build* is the opposite of *raze.* Second, we would like teachers to have a clear understanding of the issues concerning opposites even if they do not communicate these fine points to their students. We think it will help you when you are trying to think of examples to build a particular lesson or to amplify on some example of opposites a student has offered in class. Third, in the secondary years we see no reason why, at least for better students, teachers should not build lessons in which the various types of antonyms are contrasted. Opposition is an important part of vocabulary instruction; there is no reason to hide its secrets from capable secondary students. As an invaluable resource (for teachers as well as secondary students), we suggest a copy of *Webster's New Dictionary of Synonyms* (C. C. Merriam Company, 1973). Not surprisingly, it has many excellent synonyms, too.

Many of the activities suggested for synonyms can be applied to antonyms (c.f. Page 14. In addition here are some others we have found useful.)

1. Change the underlined word in the sentence to make the sentence mean the opposite.

   John hates to go fishing.
   Hazel destroyed the chair.
   That diamond is imperfect.
   That is an ugly horse.
2. See activity #5 under synonyms (pp. 14).
3. A concentration game can be modified to allow for practice of antonyms. Instead of asking students to match the same word in two different locations, ask them to match antonyms. Notice that this works equally well for synonyms.
4. For any contrary pair, make a continuum, and place words along it. Students may disagree about exactly where certain terms should go. Nurture such disagreement and discussion. It will help to sharpen their concepts for these words. Be certain to reward good reasoning; don't look for "right" answers.



Associations

We have tried to find a better term to denote this task because the term *associations* is so general. In fact, it could apply to any of the tasks listed thus far. But the other terms we could think of do not capture

the essence of this task. So we have selected the term association, recognizing full well that it is ambiguous.

What we mean by associations are words that "go together", words that would naturally occur in the same sentence or paragraph, words that you might find adjacent to one another in running discourse. Psychologists discuss two kinds of associations—paradigmatic and syntagmatic. Paradigmatic associations are words of the same part of speech that are commonly associated, e.g., tiger-lion, collie-spaniel, peas-potatoes. Syntagmatic associations are words of different parts of speech that might appear adjacent to one another in a sentence, e.g., green-grass, ferocious-tiger, hit-ball. Notice that all synonymous and antonymous associations would be classified as paradigmatic; the members of any pair are always the same part of speech. The term paradigmatic (from paradigm) is used to denote the fact that the two words come from the same *class* of words. Syntagmatic (from syntax) denotes a bond established by the syntax (word order) in which the words commonly occur. *Green* (adjective) often modifies *grass* (noun); *ferocious* (adjective) often modifies *tiger* (noun); *hit* (verb) often takes *ball* (noun) as an object; *swim* (verb) is an action which is often located in a *pool* (noun). Notice that many of these syntagmatic associations are like the attribute relations described in Chapter 1: dogs *do* bark, grass *is* green, etc.

At this point it would be fair to ask us why we have selected such a vague task to include in our instructional program. It is included because it is such a pervasive influence on comprehension and in instructional programs. How, for example, does a reader decide which word fits into the blank in the typical fill-in-the-blank activity?

What a beautiful_____sky!

We believe it is the accumulated store of knowledge including associations of the type we have described that allows a reader to complete such a task. The contextual fit a reader achieves in such a task is a direct function of the wealth of syntagmatic and paradigmatic associations brought to the task.

The following set of instructional activities can be used to promote children's ability to manipulate associations:

1. *Fill-in-the-blank activities.* There are so many ways of structuring fill-in-the-blank exercises that we could not possibly discuss all the alternatives. Here are a few alternatives.
   a. No choices.
      The sky is so_____it looks like the ocean.
   b. Choices which are semantically different.
      The sky is so _____it looks like the ocean.
      blue red orange
   c. Choices which are syntactically different.
      John_____the race yesterday.
      ran runs running
   d. Choices which are graphically similar.
      The sky is so_____it looks like the ocean.
      blue glue blur

Notice that the set of choices given determines the other skills which must be employed to solve the task. In tasks (1a) and (1b) word knowledge is emphasized; in (1c) word knowledge plus knowledge of inflection endings; in (1d) initial and final letter-sound relations are emphasized in addition to word knowledge. The point is this: typical fill-in-the-blank activities, especially when choices are given, tap something besides word knowledge and associations between pairs of words. Hence you must have a clean objective in mind when you select or create a fill-in-the-blank-activity.

3. Free associations: when introducing vocabulary, use the free association technique described and exemplified on Page 1-7 in Chapter 1. The associations you get from the children can form the basis of vocabulary lessons for the new words in a selection. First, ask each student to jot down the first word that comes to mind when you hear the word_____. Afterward, pool all the associates from the group. Then discuss the meaning of the new word as it relates to the associates offered by the group. Well, it is like a_____, it is different from_____, etc.
4. Concentration can be modified for instruction in associations. Simply make the criterion for a match, a pair of words that go together, e.g., the matching pairs might be blue-sky, green-grass, tall-building, run-race, hit-ball, rapid-transit, etc.
5. Sentence writing: give students a list with pairs of associated words; for each pair, ask them to create a sentence using both words.

A note about association activities: we believe that this comprehension task, as well as most comprehension tasks in this chapter, require a flexible attitude toward "correct" answers; there are many reasons why two words can *go together*; as a teacher you have to be willing to accept deviant responses for which students can offer plausible justification.

Complex Associations

Classification Activities

Thinking back to Chapter 1, remember that one of the important aspects of concepts was the *class relation*; that is, concepts belong to classes, and the nature of that relation is captured by the compound, *isa*. A dog *isa* mammal; a mammal *isa* animal; a cat *isa* pet. We believe that classifying is the most common and certainly one of the most important forms of human thinking.

Consider what happens to you when you encounter a strange creature for the first time. You wonder, "What is it? Is it dangerous? Will it hurt me?" Then someone tells you, "Oh, it is just a strange kind of dog you haven't seen before." Somehow knowing it is a type of dog allays a whole set of fears; it isn't a wild boar, or a frisky porcupine, or a frightened skunk.

As soon as we can identify the class of things to which a new stimulus belongs, we are able to assign all the attributes of that class to the new stimulus. To use the language of Chapter 1, we assimilate the new information. As a consequence, we are able to call up from our memory a whole range of experiences for comprehending and dealing with the new information. We pet the new thing instead of running away from it. We expect it to bark; we are surprised if it moos. Classification is not only convenient, it is absolutely essential for dealing with one's world; if we had to treat each new stimulus as a unique entity, our memory stores would surely reach overload very soon.

It is our contention that classification activities are among the most helpful a teacher can direct or assign to students; further, we believe it is a task that can be used at any developmental level from pre-school through graduate school.

As a teacher, there are a variety of ways that you can structure classification activities. There are several factors that will influence the difficulty of the classification task. Among these are: (1) the familiarity of the concepts used, (2) whether or not the class labels and the examples to be classified are provided for the student *or* must be self-generated, (3) whether or not the categories used are mutually exclusive (mutually exclusive means that each example to be classified fits into one and only one category), and (4) whether the category labels represent true classes (e.g. animals) or categories based upon a common attribute (e.g., things that bark).

While we would not argue that there is an optimal sequence for introducing classification activities, the following sequence is one that we and our colleagues have found useful.

1. As early as kindergarten, begin by asking children to categorize pictures that represent familiar concepts that clearly belong to a single category. Food and clothing, animals and plants, fruits and vegetables, furniture and dolls are pairs of classes that might be used at this early stage. (One note: stay away from the category, toys; almost anything can be a toy, e.g., truck, car, hammer, saw, chair, or workbench.) Begin with the labels for the categories and ask children to place the examples in the appropriate category.
2. Reverse the procedure: place a set of clothing concepts and tools into two rows. Ask which row has clothing; which row tools.
3. Mix the clothing cards and the tool cards. Without giving the labels, ask students to place the cards into two categories. Assist them if they have difficulty. Once the pictures are in the correct categories, ask them how the groups differ from one another. Try to elicit a class label. Be flexible with responses. Clothing may turn out as a thing to wear, or what goes into a washing machine; tools, as building things or things in a garage.
4. As students begin to be able to read words, these same three steps can be repeated with words rather than pictures. Notice that the third step is always the most difficult; somehow, without the label for the category, the task is much more difficult. We recommend that, until about grade three, only clear classes should be used, e.g., types of animals, plants, common real world objects, games. After that time, categorizing by attribute (e.g., things that have wings, things that have handles, things you could tear) can begin.
5. Next begin asking students to categorize by attribute, as mentioned in point #4. The minute you start children categorizing by attribute, you increase the likelihood that you will not have mutually exclusive categories. Suppose, for example, one of your categories is *things that have wings* and another is *things you can ride in*. Notice that cars and airplanes can fit into either category. The point is that, at least in the initial stages, you should select or create your activities carefully to avoid confusion. Another problem with categorizing by attribute is that it is more difficult to discover the commonality than it is when categorizing by class membership. Contrast, for example, the set, collie, spaniel, dachshund and poodle (all dogs) with the set, cow, dog, chair and table (all four-legged items). Until grade 5 or 6 it is probably wise to use category labels when asking students to categorize by attribute.
6. The next factor to add into the categorization sequence is categories that are not mutually exclusive, requiring that students be able to identify those words that belong to more than one category. Consider the categories, *types of animals*, *games to play*, and *things you might find on a golf course*. Because of their multiple meanings, words like donkey, fish, birdie, eagle and horse fit into more than one category. Notice that a concept like snake fits into more than one category, not because of multiple meanings, but because it is an animal *and* you could find it (and other animals) on a golf course.
7. *Semantic Feature Analysis*. We believe that one of the most useful classification activities is semantic feature analysis.

   In the figure presented earlier, we demonstrated to the class, examples and property relationships which exist among concepts. Through semantic mapping or

through the type of feature analysis described here, we can quickly see that the English language is remarkably parsimonious. Practically speaking there is no such thing as an identical synonym. No two words have exactly the same range of meaning, for if they did, one of them would likely fall out of use. As the language has developed and expanded, certain words have come to replace others and, as the poem which opens this chapter shows, some words have taken on new meanings

But it is very important for children to grasp the fact that the term synonym refers to "something-like", not "the same as". Until one clearly realizes this truth, a good deal of semantic precision is lost to the child, both as s/he reads and as s/he writes. We have found semantic feature analysis a worthwhile activity for two reasons. First of all it helps to clearly demonstrate the uniqueness of each individual word and secondly, it is useful for direct instruction to add "something-like" synonyms to the individual's vocabulary.

We favor the use of pluses (+) and minuses (-) to indicate whether or not a word has a given feature even though we realize that many features of words are not truly dichotomous, but rather exist in varying degrees. As children learn to read better and become more skilled with feature analysis, it is appropriate to substitute a scale of numbers (Lichert type of 0 to 10, for example) for pluses and minuses.

The procedure is very simple. Begin with a list of known words which share some properties. For example, you might begin with types of conveyances if the words are known to the children: *bicycle, motorcycle, car, skateboard.* These words are listed in a column on the chalkboard or on paper. Then have the children fill in the matrix by putting pluses or minuses beside each word under each feature, as is shown below.

After this has been completed, two more activities occur the children are asked to suggest more words that share some of these features (*tricycle, bus, go-cart;* or even *ship, train, airplane*) and then to suggest more features shared by some of these words (3-wheeled, steering wheel, licensed, land, sea, air, tracks). Unless you have enormous chalkboards or lots of paper in your room, you will likely run out of space or time before you will run out of features or words. Next have the children complete the remainder of the matrix by adding pluses and minuses. Finally help them discover that no two words have the identical pattern of pluses and minuses, thus no two words are identical in meaning. With even the most synonymous pairs or clusters of words, the pattern will eventually become different once enough semantic features (either class, example or property relations) have been listed. In addition to discovering the facts of the uniqueness of words, children learn new words within a category and new semantic features they perhaps had not thought about.

Children asked to list the semantic features of the word "carrot" might very quickly mention "something to eat", something to cook", "something to chew" but eventually might add "something to plant", something to sell", "something to cut", "something to saw" and so on. In other words, they begin to discover what they already know but hadn't immediately thought of and they begin to view words in more complete and precise ways.

Semantic features can be constructed with any categories of words. We recommend that you begin with categories that are concrete and within the experience of your pupils and then progress to more abstract or less familiar categories. Beginning categories might include:

games	buildings
occupations	conveyances
tools	pets
plants	clothing
vegetables	animals
food	plants

Later categories could include:

moods	modes of communication
feelings	entertainment
commands	musical instruments
sizes	machines
shapes	

The categories of words in our language would comprise a lengthy list as would the words and features within many categories.

In summary, semantic feature analysis involves the following steps:

1. Select a category (conveyances).
2. List, in a column, some words within the category (bicycle, car).

	2 wheel	4 wheel	motor	passengers	enclosed	handlebars	rubber tires
bicycle	+	-	-	+	-	+	+
motorcycle	+	-	+	+	-	+	+
car	-	+	+	+	+	-	+
skateboard	-	+	-	-	-	-	

3. List in a row some features shared by some of the words (two-wheeled, motor).
4. Put pluses or minuses beside each word beneath each feature.
5. Add additional words.
6. Add additional features.
7. Complete the expanded matrix with pluses and minuses.
8. Discover and discuss the uniqueness of each word.
9. Repeat the process with another category.

As children gain experience with semantic feature analysis they will begin to see that some words share the same feature but vary in the amounts or degrees of that feature. (Both illnesses and diseases are serious, but diseases are more serious.) At that time you may want to switch from a + and a - system to a numerical system (0-none, 1-some, 2-much, 3-all) so that greater precision can be attained.

There are a host of useful categorization activities, many of which you undoubtedly already use. Some formats that we have found useful are listed below.

8. *Straight-forward categorization.* Give the students a worksheet with a set of scrambled words and three category labels at the bottom of the page. Ask them to write the words under the appropriate category labels.

struggled	dinosaurus
asphalt	deposit
roamed	pits
creature	gas
sticky	lizards
stiffened	lumbered
tyrannosaurus	charge
striding	triceratops
ankylosaurus	trap
black pools	gripped
jump	walked
brontosaurus	beast
stuck	tar
meat eaters	stretched
oil	saber-toothed tiger

Write the topics on your paper. Put the words under the right topics.

Prehistoric Animals Tar Pit Terms
Animal Body Movement

9. Place an additional constraint on the task by asking students to categorize by class and by initial letter.

	Jobs	*Flowers*	*Tools*	*Games*	*Sounds*
R	Radio Operator	Rose	Rake	Racketball	Roar
E	Engineer				
A	Accountant				
D	Dairy Farmer				

Ask the students to discuss their choices, and have those who have omitted spaces fill in the blanks with suggestions from other students.

10. *Omission.* In this activity, students are presented lists of words which contain one word that doesn't fit. They are to decide on the misfit and explain why it doesn't fit within the others. If this is done as an independent activity, it should be followed by a discussion. Often the discussion will lead to a category label.

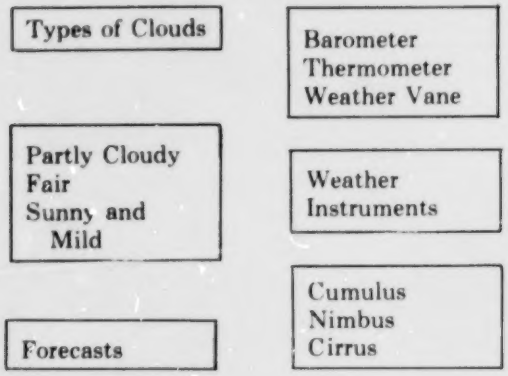
elbow	fly
jaw	mosquito
cheek	bee
nose	raisin

11. *Vocabulary Review.* Several secondary teachers have found that classification can be an effective technique for vocabulary review. Somehow, it helps to tie things together. For example, a unit on the federal system might end by placing the following words into categories.

state decisis	appeal
fillibuster	hearing
advise and consent	makes laws
gerrymander	amicus curie
Supreme Court	committee system
interprets laws	Cabinet
Senate	enforces laws
House of Representatives	bureaucracy

Legislative *Executive* *Judicial*

12. *Common Elements.* You've probably all played the parlor game called "what do these things (or people) have in common". Here are some examples:
    lettuce, tomatoes and olive oil (salad ingredients)
    rabbits, turtles and grasshoppers (characters in Aesop's fables)
    Thomas Dewey, Adlai Stevenson and Hubert Humphrey (they all lost presidential elections).
13. *Giant Pyramid.* As a take off on a T.V. game show popular until the late 1970's, this can be an entertaining group activity. Make up cards with a category label and members of the category. The guesser gets the category cue; the cue giver gives cues about each member of the category to help the guesser identify each word. Set a time limit. Divide the class into groups if you like competition.
14. *Concentration.* You can modify the concentration game format to accomodate category activities. A match is achieved when a person can locate a pair consisting of a card with the category label and a card with the members of that catetory.



Analogies

Many of you have probably had the dubious privilege of taking an aptitude test based on analogies at some point in your professional career. You may remember something like:

Science: inductive = Mathematics:_____

(a) data
*(b) deductive
(c) numerical
(d) reductive

If such a test has been your only experience with verbal analogies, you may question their inclusion in a comprehension program for younger students; however, analogies are powerful logical and linguistic organizers and deserve inclusion in a comprehension curriculum at the earliest possible point. Even five-year-olds are capable of completing an analogy like, *dog* is to *puppy* as *cat* is to_____. Interestingly, analogies are usually based upon a comparison of the types of associations we have introduced thus far. For example, hot: cold = tall: short is an analogy based upon two antonomous relations; it could be paraphrased, just as hot is the opposite of cold, so tall is the opposite of short. Flea: insect =dog: mammal is an analogy based upon class relations; it could be paraphrased, just as a flea *isa* insect, so a dog *isa* mammal. Dog: bark = cat: meow is an analogy based upon comparable attribute relations; it can be paraphrased, just as bark is an attribute of dog so meow is an attribute of cat, or just as dogs bark, so cats meow.

When can you begin activities in analogies? There is no hard and fast answer; but in general, as soon as a student knows that a dog barks and that a cat meows, then s/he is ready to learn that barking serves the same function for a dog that meowing does for a cat. In fact, analogy can be a powerful tool when you are trying to introduce new concepts to students. Suppose a group of students know that crickets communicate by sound (it is in fact true that one species of cricket can determine which crickets to mate with on the basis of sound). The comparable communication mechanism for cockroaches is smell (different species sort out their own kind by smell). Thus the analogy, sound: cricket = smell: cockroach, summarizes an important comparison between these two types of insects.

To use another example from science, suppose students know that animals have to intake oxygen to survive; learning that plants need to intake carbon dioxide for survival might be enhanced by establishing an analogous relation such as, oxygen: animals = carbon dioxide: plants.

Here are some activities that can be used to promote practice in handling analogies.

1. Establish a whole list of pairs of words that are related to one another in an analogous fashion. Give a few examples and ask students to add more, either from their own experience or from consultation with a dictionary or encyclopedia.

PARENT:	CHILD
dog	puppy
cat	kitten
lion	cub
deer	fawn
BIG:	LITTLE
river	stream
ship	canoe
Cadillac	Volkswagen
lake	pond
horse	colt
tiger	cat
ocean	sea
ANIMAL:	SOUND ATTRIBUTE
dog	bark
cat	meow
lion	roar
horse	neigh
ANIMAL:	HOME
lion	den
deer	thicket
bear	cave
robin	tree nest
pheasant	reed nest
eagle	aerie

2. A teaching colleague of ours has a delightful continuous classroom display, consisting of a giant tagboard ice cream cone into which students pile scoops on each of which is written a_____is like a_____only bigger

   Students add to the pile of scoops whenever they can create a relationship that fits the constraints of task. Similar displays could be created for relations of length (a_____is like a_____only longer), smoothness or heat.

3. Don't rule out the traditional format for analogies: simple practice sheets with items consisting of three parts of an analogy for which the students choose or create a fourth.

   dog: bark = cat:_____

   growl neigh meow roar

The activity can be modified by asking students to match one half of an analogy with the other half:

dog: bark = _____: _____

horse: roar bear: neigh cat: meow

Instead of putting these on worksheets, you can put them onto cards to be used in a game format.

4. We have experienced success using analogies in a concentration format with older students. A match is achieved when two halves of an analogy have been identified.

river: bank	horse: colt
day: light	peas: green
carrots: orange	night: dark
ocean: shore	cow: calf

5. As we continue to say for each of these word level tasks, there are a variety of simple games that can be modified to analogy tasks. Consider the ubiquitous Rocketship to Somewhere game typically used for word recognition activities. It can be made an analogy activity simply by placing an analogy item (as in #2 above) on each of the game cards.

Connotation/Denotation

For the first few years of schooling, we are satisfied (perhaps delighted) if a child can acquire even a vague notion of what a particular word means. We are happy, for example, if a child is able to figure out that enormous means big. But at some later point (one whose onset is difficult to specify) we want that same child to know that the phrase, an enormous rock, connotes a different shade of meaning than does the phrase, a big rock.

We are convinced that by the upper elementary years, and especially in the secondary years, students need direct instruction in discriminating the subtle shades of the meaning conveyed by words that denote the same object, action or feeling in the real world. The need for this type of instruction increases as children are increasingly involved in legitimate children's or adolescent literature.

This task is intrinsically bound up with the synonym task. With a few exceptions, it is accurate to state that two words that are synonymous at one level of meaning (denotative) are different at another level of meaning (connotative). This task is also related to categorization tasks; for example, we can ask children to identify the commonality in a set of words: e.g. saunter, stroll, stride, march, wobble, teeter, trudge and ambulate (they are all ways of walking). In fact, a thesaurus is nothing more than a categorical listing of words that all denote a similar experience in the world but connote a different attitude about that experience.

There are many ways of organizing activities to promote the ability to discriminate among denotatively similar words.

1. As a group activity, place the following sentence frame on the chalkboard. Then insert different words all denoting the activity of walking into the verb slot. Discuss the differences in meaning which result.
   Susan_____through the woods.
   (walked, trudged, skipped, strolled, ambled, sneaked, strode, etc.)
2. Assign questions such as the following, asking students to justify their responses:
   a. Would you rather *eat* with someone or *dine* with someone?
   b. One person *strode* through the park; another *trudged* through the park. Who walked faster?
   c. Who is prettier? Someone who is *pretty* or some who is *gorgeous*?
   d. Who is hungrier? Someone who is *hungry* or someone who is *ravenous*?
3. *Ranking synonyms on a single feature.* Ask students to rank lists of words on the basis of intensity, strength, approval, beauty or any other feature on which they differ in degree. Some sample lists are provided below. A thesaurus is invaluable in generating further lists.

ailment	astound
poor health	astonish
illness	flabbergast
sickness	surprise
disease	predictable
loathe	afraid
abhor	panicky
dislike	terrified
hate	scared
despise	frightened
love	
like	
adore	
admire	
tolerate	

4. For older students, ask them to consult a newspaper or periodical. Ask them to jot down all the different words that are used to denote speaking, for example. Have them discuss differences in meaning that result from words like said, remarked, exclaimed, discussed, disagreed, argued, etc. Similar lists could be made for walking or running (the sports section is replete with such examples, however hackneyed they may be).
5. As a modification of #2 above, omit two words in a sentence frame, asking students to select pairs of words that go together.

The_____boy_____through the park.

frightened	sneaked
happy	skipped
pensive	strolled

Ambiguous Words

The last three tasks fall under the rubric of ambiguous words, implying that meaning is not always clear. We will deal with three kinds of ambiguous words: multiple meaning words, momophones (words that sound alike but have different spellings and meanings) and homographs (words that are spelled alike but have different pronunciations and meanings).

Multiple Meanings

Most words have more than one meaning. It is through the use of sentence and paragraph context that we are able to decide which alternative meaning to assign to a word (e.g., fly - soar versus fly - insect). Furthermore the more common a particular word is used in the language, the more meanings it is likely to have. Contrast common words like run, fly, bear, case and hit with uncommon words like platypus, microscope, flattery and van. In the former set each word has several common meanings whereas in the latter set each word has at most, a few meanings.

As was the case for the connotative-denotative task, there is a point at which we are happy if a student is able to select a single meaning (hopefully the one associated with a reading selection) for a given word. But there is a later point at which we want that same student to recognize the multiple meanings assigned to a given word.

When can instruction in multiple meanings begin? Again, there is no set time. It hardly seems worth the effort in grade one, although we have found many five-year-olds who recognize the fact that words have multiple meanings, (as is evidenced by their penchant for puns). Certainly beginning sometime in primary years and continuing throughout formal schooling years, such activities are desirable and necessary.

Below are listed several activities that can be used to promote an awareness of multiple meanings.

1. *Definition or Usage.* Ask children to provide definitions or sentence contexts for words you wish to stress. For example, you may say, "Use each of the following words in three (or four or five) different sentences which show the different meanings of the word."

plant	run	watch
ring	check	bank
order	stand	swing

2. *Definition Matching.* Write the word in various sentences and ask the pupils to match the appropriate sentence and definitions:
   a. She wore a wedding *ring*.
   b. The boxer left the *ring*.
   c. Do you see that *ring* of trees?
   d. I heard a loud *ring*.

   a. Sound of a bell.
   b. A number of objects in a circle.
   c. Circular band worn on finger.
   d. Site of a boxing match.
3. *Sentence Matching.* This activity is the same as the one above except the task is to match sentences which portray the same meaning of the word.
   a. His *watch* keeps good time.
   b. Are you going to *watch* T.V.?
   c. The guard had a quiet *watch*.

   a. This relief came before the end of the *watch*.
   b. My *watch* is at the jewelers.
   c. Did you *watch* the parade?
4. *Sentence Writing.* In this case the meaning of the word is shown by its use in a sentence. The pupil's task is to write a new sentence which shows the same meaning:
   a. My sister got a job at the *plant*.

   _____

   b. They brought me a *plant* when I was in the hospital.

   _____

   c. Tomorrow we will *plant* the shrubs.

   _____
5. *Illustrations.* Primary grade children in particular enjoy drawing pictures to demonstrate concepts. One such activity looks like this:

   Double Trouble

   Many words have double meanings. Draw pictures to show the double meanings of some of these words!
6. *The Narf Game.* Use a nonsense word like "narf" to substitute for a real word missing in three or four sentences. Each time "narf" is used, it is used with a different meaning of the intended word in mind. When students think they know the real word, have them locate the page in the dictionary where the word is found. (This feature allows the game to go on even after the faster students have found the word.) After a few examples, students at grade three and above can generate their own examples.
   1. A *narf* is not the kind of animal you'd like to meet alone in the woods.
   2. That apple tree should *narf* fruit this year.
   3. The burden was too much to *narf*.
   4. The stock market was in a *narf* cycle.
   (narf = bear)
7. The narf game can be translated into an independent activity by allowing students choices to select from when they encounter the item on a worksheet. For the example in #6, the choices might be wolf, give, take and bear. Notice that each choice fits at least one of the sentences, but only bear fits all four.

Homographs

Homographs are words that are spelled alike but differ in both pronunciation and meaning, words like read (rhymes with heed) and read (rhymes with red) or CONtent (material) and conTENT (happy). Homographs could be a potential problem in reading comprehension if there were enough of them in our English writing system to cause confusion. Fortunately there are not very many. We have listed the most common below.

aged	excuse	seer
arch	forte	sewer
august	gallant	shower
bases	gill	singer
bass	herb	slaver
blessed	hinder	sow
bow	intense	stingy
bower	interm	subject
buffet	intimate	tarry
close	invalid	rear
collect	job	tier
colon	lead	transfer
commune	live	use
compact	minute	vice
conduct	mow	wind
conjure	nice	wound
conserve	object	bowed
console	patent	converse
consort	permit	convert
content	present	frequent
contract	primer	kinder
desert	project	leading
digest	read	perfect
do	record	putter
does	refuse	prayer
dove	retail	relay
entrance	row	

We have not encountered a host of instructional activities for dealing with homographs; however, the following can be used starting in the intermediate years.

1. *Definition matching.* Students match a sentence using one of the members of the homographic pair with an appropriate definition.
   John will *lead* us into the mine._____a. guided
   Watch out for the *lead* pipe. _____b. a metal
2. *Sentence construction.* Encourage students to construct sentences using both members of a homographic pair.
   John will lead us into the lead mine.
   I hope the garbageman will not refuse our refuse.
   I'd like to record your new record on my tape machine.
   Without a permit, they will not permit us into the park.

Homophones

There is considerable dispute regarding the positive or negative influence of homophones—words that sound alike but differ in spelling and meaning. On the one hand, their existence forces us as readers to learn that two different spellings can yield the same pronunciation; on the other hand, the different spellings provide an additional cue to meaning. For example, when we see the word *fly*, we do not know whether it is the insect or the soaring that is referred to; however, when we see *reed*, we know the referrent is a tall grass and not what we do with words (read). Consider what our writing system would be like without homophones. Read the three versions of a paragraph which follow:

Either the none oar the buoy herd the bell, butt the bell told four sum won else.

ē thər thə nŭn or thəboi hurd the bĕl, bət thə bel tōld for sŭmwŭn ĕls.

Either the nun or the boy heard the bell, but the bell tolled for someone else.

The point is that homphones are not necessarily negative influences on reading comprehension. They may confuse the decoding task, but they may help the comprehension task in reading.

The following types of activities may be used to help students deal with homophones.

1. *Definition matching.* As with homographs, students can match a members of a homophononous pair with appropriate definitions.
   Sarah *threw* the ball at the wall.____a. finished
   He is *through* with the job._____b. hurled
2. *Sentence construction.* Have students construct sentences using both members of a homophonous pair.
   The thieves tried to steal the steel pipes.
   George felt weak all week.
   She just sits there and stares at the stairs.
   The boat went straight through the strait.
   You mean she dug the whole hole.
   I thought the bus fare was fair.
   She threw the ball through the window.
   She taught us how to tie a taut knot.
   We were not allowed to read aloud.
3. *Hink hinks.* Remember the old hink hink game. One person gives a definition the answer to which is a pair of words that rhyme. For example, a fruit thief is a *melon felon*, or a sign for a horse ranch might be a *stable label*. Well, hink hinks are simply the same word used twice. Sometimes they are homophones; a *cannon canon* is a law governing the use of large guns or a bargain on iron might be a *steel steal*. Other times they are multiple meanings of the same word form: a *fair fair* might be defined as a mediocre exposition or a person who sells stolen property boundary markers on the black market might be called a *fence fence*. You may want to use the above four.

4. No section on homophones would be complete without suggesting the proverbial "pair tree" display for a classroom. As students come up with homophonic pairs, they write the pair on a paper pear and add it to the "pair" tree constructed of tagboard or the like.
5. As a resource for structuring activities in homophones or homographs, we suggest that you add a copy of this book to your school professional library: Whitford, Harold C. *A Dictionary of American Homophones and Homographs*. New York: Teachers College Press, 1966.

Summary

In this chapter we have attempted to specify that set of word level comprehension tasks we consider worthy of teaching. For the most part, those tasks represent simple and complex relations (or associations among concepts). Of the nine tasks presented, the first six are closely bound to the comprehension model presented in Chapter 1; that is, those six are examples of ways in which teachers can manipulate instruction in order to modify and expand the kinds of semantic maps students carry around in their heads. The last three, characterized as ambiguous words, are not so directly integrated with that same model of comprehension. Nevertheless, we feel that it is important for you to emphasize those tasks because they represent possible complications in the process of reading comprehension.

In closing this chapter it is appropriate to highlight two points that have been implied throughout the chapter.

1. At least for word level comprehension tasks, the number of formats in which they can be presented or practiced is virtually unlimited. Most of the game formats that are so widely used for word identification activities can be modified for word level comprehension tasks. Note, for example, how many times we suggested a concentration format for different tasks. Also, the computer box activity on p. 18 could be used for several of these tasks.
2. Simply giving students worksheets or games and allowing them to practice on their own is not sufficient. Discussion and feedback are important to clarification of many of these tasks. We wish to underscore their importance, lest you get the impression that we advocate a paper and pencil curriculum.

Suggested Readings

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CHAPTER 3
Comprehension of Sentences

Richard J. Smith, Ph.D.

Although the sentence is a major building block in the construction of printed message, it is often given only cursory attention by students who are asked more questions about words, paragraphs and entire selections than about sentences. Like the middle child in some families, the sentence is often "passed over". In fact, the sentence may be the most neglected unit of language in the teaching of reading comprehension. Most teachers spend far more time teaching students to comprehend words, paragraphs and whole selections than they spend teaching them to comprehend sentences. The sentence often stands misunderstood and unappreciated between its capital letter and its end punctuation mark because students have not been taught to take from it all it has to give.

The major thesis of this section is that sentences are being short changed. They deserve a better break. Too much of their potential is being wasted. Teachers of reading must become more dedicated to teaching students to realize the full communication potential and aesthetic appeal of the sentences many students now perceive as no more than groups of words between the beginning and end of a paragraph, chapter, story or other passage. As trainers of teachers you can help teachers help students to help themselves to better understanding and greater appreciation of any well-written selection by reading sentences more carefully.

Certainly we would not want students to overemphasize sentence analysis as they read. The goal is to help students get full meaning and appreciation from sentences without interfering with their understanding and appreciation of paragraphs and complete selections. Just as teachers can overemphasize word identification skills to the point that word analysis interferes with sentence comprehension, they can overemphasize sentence analysis to the detriment of the comprehension of larger units.

The remainder of this section is written so that trainers of teachers may extract parts of it for sharing with teachers as it is written or modify the material to meet certain needs in certain pre-service or in-service teacher education programs. The purpose of this section is to provide suggestions about sentence comprehension for teachers of reading to consider, experiment with and evaluate according to their own preferences and their students' needs. Because of the lack of empirical evidence to support certain instructional practices for the teaching of sentence comprehension and to reject others, teachers' subjective evaluations of what works well and what does not is presently the best approach to the improvement of this aspect of reading curriculum. Therefore, our first suggestion for teacher trainers is to get classroom teachers and special reading teachers actively involved in "trying out" the suggestions we offer, which, by the way, are by no means the only way to approach the teaching of sentence comprehension or exhaustive of the many suggestions that might be made. The objectives of teachers' efforts should be clear to them as they begin their work: (1) to improve students' understanding of the message the author was trying to communicate when she or he wrote the sentence and (2) to increase students' appreciation of sentences that are aesthetically pleasing as well as informational.

Suggestions for Teaching Sentence Comprehension

Suggestion 1: For the most part teachers should use the sentences in students' regular instructional materials and library materials for teaching sentence comprehension.

The purpose of using regular instructional and library materials is that lists of sentences specially constructed for teaching sentence comprehension are for most students not needed. In addition, these lists of sentences are sometimes so artifically constructed and so always out-of-meaningful larger contexts that they are not as suitable for teaching students to get information and pleasure from sentences as are the other printed materials they use for learning and for enjoyment.

Selections in basal series are excellent source materials for teaching beginning readers to comprehend the sentences they are learning to say accurately and with good expression. The teacher's task is to teach beginning readers that good readers can talk about the meanings of sentences after they have said all the words right. A major advantage in using sentences from students' regular instructional and recreational materials instead of materials that are designed exclusively for teaching sentence comprehension is that with the former, students' sentence comprehension skills development begins with and keeps pace with their reading development in other reading skills.

Some beginning readers and some older students may have more than the usual amount of difficulty learning to comprehend sentences. These students may profit from lists of sentences for which activities

for teaching sentence comprehension have been designed. Three activities that are often helpful in teaching basic sentence comprehension skills using lists of sentences constructed for that purpose are: (1) asking students for "yes or no" or "true or false" responses to sentences, (2) asking students to agree or disagree with sentences and (3) filling in words deleted from sentences (clozing).

Examples of sentences for Activity 1 are the following:

(a) A cow is bigger than a cat.
(b) Do you like candy?
(c) All dogs bite people.
(d) Is fire hot?
(e) The sun usually shines when it rains.

The following are examples of sentences for Activity 2:

(a) Watching TV is more fun than reading.
(b) Dogs are better pets than cats.
(c) School is no fun at all.
(d) Saturday is the best day of the week.
(e) A big city is a good place to live.

The following are examples of sentences for Activity 3:

(a) John ran when he heard his mother _____.
(b) To stay warm Eskimos _____warm clothes.
(c) Take what you want, but eat what you _____.
(d) The rock was too _____ for _____ to lift.
(e) She _____the ball to _____.

Any sensible replacements should be accepted for Activity 3. When different students supply different but sensible replacements, the differences in the messages the sentences communicate should be discussed.

Suggestion 2: For beginning readers stress literal comprehension.

One reason for stressing literal comprehension for beginning readers is that sentences in materials for beginning readers are short and about concrete objects or situations. Therefore, they do not lend themselves well to inferential comprehension. For another reason, beginning readers are working so hard to say all the words right and to learn the simple sense of the sentence that to ask them to go beyond that level of achievement is usually more than they can do and, therefore, probably counter-productive to the development of comprehension skills.

Teachers should require students to answer correctly direct questions (aided recall) about specific sentences (e.g., Who were going on the picnic?) and to recall, without prompting, the sense of the sentence (e.g., Tell me that sentence in your own words). However, paraphrasing most sentences is likely to be difficult for beginning readers since the simplicity of the structure and content of the sentences are likely to allow little more than repeating. Therefore, teachers will probably find that asking literal questions about sentences is, with some exceptions, the best way to teach and evaluate sentence comprehension for beginning readers.

Suggestion 3: Take time to help students to comprehend sentences containing figurative language.

Too many students, and perhaps teachers, don't take time to profit from the full potential of figurative language. In some classrooms, figurative language is either ignored or treated as if it imposes upon readers more than it enriches them. Notice the communication power and the aesthetic appeal in the following sentences:

(a) Peter wrote the poem out of his head and his heart.
(b) The cat tails guarded the river bank like a platoon.
(c) When he looked at the "A" on the top of his test, the rubber band in his chest broke.
(d) The microscope was her passport to a world that didn't exist until she gave that world life by bringing it into focus.

Sentences such as these can be removed from their contexts in basal series, textbooks and other instructional materials or library books and talked about. The following questions are useful for helping students interpret and enjoy sentences containing figurative language:

(a) Why is this figurative language? (i.e., a microscope is not a passport; the world of microbes was alive before it was brought into focus.)
(b) Try to remove the figurative language without changing the message of the sentence.
(c) Which do you like better, the message expressed in figurative language or the message without figurative language.

Teachers should be on the alert for sentences containing figurative language in the reading materials they assign. The comprehension and enjoyment of sentences with figurative language are probably taught better on a day-to-day, on-going basis than by teaching a unit on figurative language and then ignoring figurative language as if students had learned all they need to know about it once and for all.

Suggestion 4: Teach students that much meaning in sentences is carried by their "melodies".

When authors are writing sentences they are saying the words in their minds. In effect, they are talking their words onto the paper. Because the punctuation system for the English language is so meager, readers, with relatively little assistance from punctuation marks, must tune into many of the pitches, stresses and pauses authors had in their heads when they wrote. Notice how the melody of the sentence

"He hit him" must change to answer each of the following questions:

Who hit him?
What did he do to him?
Whom did he hit?

Asking students to read certain sentences aloud helps them to stay alert to the need for reading silently with good expression just as they read orally with good expression. Of course in silent reading the words are subvocalized, below the level of lip movement.

Having students read some sentences aloud to achieve clarity of meaning is an especially good procedure for content area teachers. Notice how the messages of the following sentences become clearer when the sentences are vocalized or strongly subvocalized:

When the Declaration of Independence was read to a group of citizens, most of them heard for the first time ideas such as: "All men have a right to life, liberty and the pursuit of happiness."

In scientific investigations—especially those for which data are collected—the importance of good record keeping cannot be overstressed.

Because of poor refrigeration, lack of waste disposal facilities and general ignorance of basic sanitation practices, the tribe suffered from disease, malnutrition and overall discomfort.

A good technique for helping students learn how important to meaning the melody patterns in sentences are is to have them read aloud sentences that communicate different messages when they are read with different intonation patterns. For example, depending upon which word is stressed, the following sentence has several meanings:

He chose to take the longer route. (not she, but he did the choosing)
He *chose* to take the longer route. (no one forced him)
He chose to take the *longer* route. (not the shorter, but the longer)

Stories in basal series and literary selections abound with sentences for teachers to use as illustrations of the importance of reading sentences with the intonation patterns the author intended. Including prepared oral reading (for average or good readers) as a small but regular part of students' activities in the reading curriculum and other curriculum areas is good for continuing students' sentence comprehension development. Students who are chosen for this audience type reading should have time and help to prepare what they will read, and students who are listening should have their books closed. The teacher should have his or her book open to give immediate prompts when they are needed.

Suggestion 5: Teach students to interpret carefully the specific relationships signalled by words that are frequently used to relate different pieces of information in sentences.

Our recommendation for implementing Suggestion 5 may seem overly simplistic. However, teachers must remember that when they are teaching reading to students who are native English speakers, there is little need to teach the students how their language works. They know how it works. Therefore, our recommendations in regard to Suggestion 5 are aimed at helping students become as careful about interpreting relationships in printed sentences as they are about speaking sentences and interpreting spoken sentences. The point is that there is no need to study lists of words that writers use to express interrelated ideas or information. Nor is there a need to categorize those words as to whether they are used to show coordinate, subordinate, conditional, temporal, positional or whatever relationships. The interpretation problems students have with sentences containing ideational relationships are more the result of inattention or carelessness than of lack of knowledge about how English sentences work. For the most part students who are not comprehending the relationships expressed in sentences they read are thinking superficially as they read the sentences. This assumes, of course, that the students are reading material at an appropriate level of difficulty.

Our basic recommendation is that teachers question students frequently about the sense of sentences that contain interrelated ideas or information. The questions asked should (1) elicit from students the specific relationships that are expressed and (2) focus their attention on the word or words that specify those relationships.

The following sentences contain interrelated ideas or information. The questions after each are examples of the kinds of questions that teach students to stay alert and to which words they need to give special attention while reading such sentences.

The party was cancelled because Julie came down with scarlet fever.

(a) Why was the party cancelled?
(b) What are the two pieces of information in this sentence?
(c) What word tells how the two pieces of information are related?
(d) Would the message in the sentence change if the word "after" were substituted for "because"?

If the plans are accepted, I'll soon be a millionaire.

(a) Is the speaker certain he or she will be a millionaire?
(b) What word expresses the uncertainty?
(c) How does substituting the word "when" for the word "if" change the message in the sentence?

John wanted to spend the day at the zoo, but Susan wanted to go swimming.

(a) What two pieces of information do you get from this sentence?
(b) What does the word "but" tell you to expect from the rest of the sentence, even before you read the rest of the sentence?

After the music started, the party shifted into high gear.

(a) What happened first?
(b) What word tells you that the two things happened at different times?
(c) Change the position of the words in the sentence to reverse what happened first and second.

The examples above, although few in number, should be sufficient to convey our position in regard to helping students comprehend sentences that contain interrelated ideas or information. Because of the great variety of sentence structures available to writers of English and the flexibility of expression (e.g., active voice/passive voice) writers employ, teachers could not teach students everything they need to know to be prepared for any sentence they might encounter. Nor is that necessary since both the writer and the reader share the same language. The key to comprehending interrelationships expressed in sentences is to know the vocabulary and to think through the vocabulary into the sense of the sentence. From our viewpoint, then, there is no shortcut to helping students comprehend interrelationships expressed in sentences. Teachers must first learn themselves the sense of each individual sentence and then construct questions that help students clarify the sense of the sentence and note the importance of words that signal particular relationships.

Suggestion 6: Teach students to notice how qualifying or descriptive words or phrases affect the central message of a sentence.

Again, we do not recommend that most students be asked to analyze lists of specially constructed sentences containing qualifying words and phrases. For some poor readers practicing with lists may be helpful, but most students will learn sufficiently well by analyzing key sentences in their regular textbooks or library materials. Most content area textbooks abound with sentences with qualifying or descriptive words and phrases for teachers and students to examine for their effect on the central message of the sentence. The following example will give teachers an idea of the kinds of sentences to analyze with students and the kinds of questions to ask for the analyses:

(a) The whip-poor-will was commanded to spend the rest of its nights calling its name from a nest on the ground.
    1. When is the whip-poor-will heard?
    2. Where does the whip-poor-will build its nest?
(b) Only the old men of the tribe made tribal decisions.
    1. Did any women make tribal decisions?
    2. Might young men make decisions that did not affect the whole tribe?
(c) The pentagon ordered all equipment over two years old to be declared obsolete and destroyed.
    1. How old is the equipment in question?
    2. What two things will happen to equipment over two years old?
    3. What percent of the equipment over two years old will be declared obsolete and destroyed?
(d) Physicians would rarely, if ever, prescribe medication for hypertension on the basis of one blood pressure reading taken in the doctor's office.
    1. Remove the words "if ever" from the sentence. Does the meaning change?
    2. Remove the words "would rarely, if ever" from the sentence. Does the meaning change?
    3. Remove the words "taken in the doctor's office" from the sentence. Does the meaning change?

Suggestion 7: Teach students to identify pronoun referents and the referents of possessives.

Correct identification of pronoun referents and the referents of words in the possessive case are important sentence comprehension skills, especially for beginning readers. The most instructive procedure for teaching this skill is simply to ask students to identify the referents of pronouns and possessives. For example:

(a) Bill wanted his sisters to go by themselves.
    1. What word does "his" refer to?
    2. What other word means the same as "sisters"?
(b) Many of the colonists were happy with *their* lives as subjects of the king. *They* thought *he* treated *them* well and gave *them* the protection *they* needed. England's warships were *highly* respected by France and Spain *who* were also world powers at *that time*.
    1. Tell what each of the *"italicized"* words or word groups refers to.
    2. To which country or countries did the warships mentioned in the sentence belong?

Suggestion 8: Teach students to form mental images of people, places, things and situations described in sentences.

Forming mental images of people, places, things and situations that are read about enhances the comprehension and enjoyment of many reading materials students choose to read or have assigned to them. Many poems, essays, narratives and expositions in instructional and library materials are rich in descriptions that evoke mental images. For example:

(a) Afloat upon the carousel,
    Splashed by sights and sounds,
    She felt the surging carnival—
    The ups, the downs, arounds.
    1. Describe the person on the carousel. How old is she? How is she dressed? Describe her posture.

2. Describe the movement of the carousel. How do the horses move?
3. What are some of the sounds and sights the person on the carousel is being "splashed" by?

(b) The wolf circled the corral, watching the horses growing restless as they became aware of the danger that threatened them.
1. Pretend this is a scene for a movie or TV program and you are the director. Describe the set you would build. How many horses would you have in the corral? What close-up shots would you want? What behavior would you want the animal trainer to get from the wolf? From the horses?

(c) He thought the touchdown was his until he saw one huge linebacker blocking the remaining twenty yards between victory and defeat.
1. Use this sentence to illustrate or tell how you would illustrate a book jacket for the story in which it appeared. What colors would you use? What details would you include? Draw or describe the whole picture.

(d) Billy gave the man his money.
1. Draw a picture of this sentence (for young readers having comprehension difficulties).

Suggestions of Activities for Pre-service or In-service Training

The eight suggestions above may simply be read and discussed with pre-service or in-service teachers. Other suggestions for teaching training activities follow.

Suggestion 1: Ask the teachers to give each of the eight suggestions a score of 1 (a good suggestion, makes sense), 2 (perhaps a good suggestion, I have some doubts), 3 (a poor suggestion, I don't like it).

If the group is not large, a chart of the scores given might be prepared, examined and discussed:

Teacher

Suggestion	1	2	3	4	5	6	7	8 ⟶
1	1	2	1	1	2	3	1	2
2	3	2	2	3	1	2	3	3
3	1	2	2	1	3	1	1	1
↓								

Teachers should be prepared to explain their reasons for giving each suggestion the score they did.

Suggestion 2: Have instructional and library materials available and ask teachers to search through them to find sentences relevant to one or more of the eight suggestions given above.

Teachers should be prepared to tell how they would teach a student or group of students the comprehension skill the sentence would be best for teaching.

Suggestion 3: Ask the teachers individually or in pairs, to construct sentences that are relevant to one or more of the eight suggestions above.

Their creations might be shared with the group.

Or the group might be divided into eight groups with each group given the task of constructing a list of five to ten sentences relative to one of the eight suggestions. The lists might be compiled, duplicated and distributed for teachers to use with their students.

Suggestion 4: If the group of teachers will be meeting over a period of time, ask each teacher to select one or two suggestions to try out with students and report on at a later meeting.

Suggestion 5: Ask teachers to contribute suggestions in addition to the eight suggested in this section, perhaps from their teaching experiences or knowledge of instructional materials.

Emphasize that the eight suggestions given above are by no means intended to be exhaustive of the ways to teach sentence comprehension.

Suggestion 6: After reading and perhaps discussing this section on "Teaching Sentence Comprehension", ask the teachers to share their thoughts relative to the following question:

How important is it to teach sentence comprehension apart from word comprehension and paragraph comprehension?

Suggestion 7: Ask the teachers to choose from the passages below sentences that are rich in aesthetic appeal for them.

For example, they might choose a sentence that creates a vivid visual image for them, one that they would enjoy the sound of if they read it aloud, one that is pleasantly startling in its content or one that communicates an idea or feeling interestingly or with clarity. Have the teachers compare their choices and their reasons for choosing the sentences they did.

1. *The United States Marine Band blasted out "Semper Fidelis" and swung around the corner of Third and Wells. The sunlight bounced off the shiny horns and off the freshly polished marching boots while the drummers' sticks bounced, rolled and hammered out the quick, rhythmic cadence.*

A little kid yelled, "Lift me up, Dad. I can't see." And in a second he was straddling his father's neck and the red, white and blue flag in his hand was bouncing in rhythm with the horns, the boots and the drums.

2 *The sun was getting warm, the sky was blue, the flowers were fragrant and the water bubbling from the spring was blue and cold. They had found this peaceful valley after walking through the night, and they would rest here. As they dozed, the sun rose behind the bluff and the air was warm and still. There was no breeze and no noise and nobody but themselves.*

Suddenly, the valley trembled as the sharp blast of a mighty horn and the pounding feet of running horses penetrated the stillness. The horses galloped at full speed along the top of the bluff and through the yellow rays of the rising sun. Fifty, one hundred, two hundred strong they thundered atop the valley. On each horse a rider, bent forward and looking neither left nor right. On every rider, a flowing cape that almost touched the nose of the horse behind it. They were more like machines than like horses and men. They were in high gear. They were beautiful to see and frightening to hear. They had a mission. They would not be stopped until they reached another valley where the spring water would turn red, the flowers would be trampled and dust would cover the sun.

3. *The bar in his hand grew heavier with each step. Carefully, slowly, sadly, the six men carried their burden.*

The bell tolled. It was the only sound he heard except for the scraping of the shoes of the men lifting the casket one step at a time. They carried it carefully as if to guard the sleep of the contents.

Once he thought he heard someone sobbing in the group that followed the closed box up the church steps. But he wasn't sure and he didn't care. A heavy weight somewhere inside him matched the weight in his hand. And he couldn't care about anyone else's grief.

4. *All day the weather bureau had been announcing a tornado watch on the local TV stations. The air was still. Air conditioners and fans had been working overtime for the past four days. Every lawn that hadn't been sprinkled daily was hard and brown. Father Anderson from Saint Anthony's Church had offered his morning masses the past three days for rain. People were complaining that the air was so hot and dry it hurt to breathe. Three more days and the corn crop would be seriously damaged if not destroyed.*

Suddenly the air began to move, and little swirls of wind appeared out of nowhere. A streak of lightning bolted downward. Just a streak, but a signal nonetheless. Thunder rumbled and people moved out onto their porches. Father Anderson was seen walking from his office over to the church.

More thunder, more wind, some drops of rain. Louder thunder, people shouting, rain falling, lightning, thunder, rain. People laughing, thunder booming, lightning flashing, rain splashing, corn growing, no tornado, blessed rain.

5. *Free and easy, that's me. No worries, no cares—just looking and listening. I got no money, but I also got no work that's got to be done.*

Hey, that sun feels great, and I got nowhere I got to be. Hey, world, look at me. I got leisure, I got time, I got it easy and free. Nobody's going to tell me, "Hey, do this!" or "Hey, do that!" Nobody's going to say, "Hey, why ain't that done?" or "Hey, when you going to get finished?" Who needs report cards? Who needs homework? Not Me! I am easy, I am free. School is out!!!

6. *The little burro plopped and clopped across the stones on the hot desert floor. Her ears were forward, and she lifted her front feet high as she stepped along. She was obviously proud, either of something she had done or something she was going to do.*

There were two heavy sacks tied together and slung over her back. She kept them balanced carefully as she picked her way down a little decline in the trail. The sacks were probably filled with rocks that some prospector hoped would give up some gold when they were broken apart back at camp. The burro had earned her master's trust and was being allowed to return to camp alone while he followed at a slower pace.

At one spot on the trail, a stumpy old tree branch stuck out over the trail. The burro always walked around it, and you could see the jog in the trail she always took to avoid the branch. This trip, however, the little burro marched proudly under the branch. She rubbed back and forth a few times until her load was more firmly attached to the branch than to her back. Then she stepped smartly out from under the sacks hanging from the tree branch. The last time the prospector saw his burro she was too far down the trail to hear his call. He knew she wouldn't stop at the camp. But he didn't know how he was going to get his heavy sacks off that tree branch. He thought he heard a hee-haw from down the trail. But maybe it was the wind.

7. *Once again the great state of Colorado has become a winter wonderland. The recent snowfall has brought skiers, skaters, hikers and snowmobilers to Colorado in trains, busses,*

automobiles and airplanes. Resort owners report that this may be the biggest year in the history of Colorado for the tourist industry.

Some resort owners are meeting busses, trains and planes with old-fashioned sleighs. The sleighs are drawn by horses just as they were before the advent of the gasoline engine. What a sight it is to see a sleigh filled with happy tourists heading out of town for the ski slopes and the snowmobile trails. The jingling bells, the prancing horses, the colored robes and the sleigh crunching across the fresh snow all combine to give the impression the year 1900 is just around the corner.

Resort owners may have taken a step into the past with their sleighs and horses, but the drivers of those rigs are still very much in the present. Finding young persons to hitch and drive the horses has been a problem. Most available young people know more about automatic transmissions than they know about harnesses and buggy whips. Rumor has it that one driver headed for Aspen couldn't get his team stopped until he reached Leadville—no power brakes on a sleigh.

For Further Reading

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CHAPTER 4

Comprehension of Passages

Introduction

Eugene Cramer, Ph. D.

In speaking of reading, when you say "comprehension", you've said it all. Isn't that why people read? To comprehend, to understand an author's message, to get the ideas from the printed page? "When an adult reads, s/he usually does so to get the thought of what s/he is reading. This is a clear pointer for the reading specialist; the child should at the very outset get the thought of what he is reading." (Mathews, 1966, p. 193)

Presumably, the purpose of reading instruction is to develop a reader who reads with comprehension. However, as teachers of reading, we face a dilemma. We must teach pupils to comprehend without understanding how the comprehension process works.

Over the centuries, philosophers, writers, scientists, psychologists and educators have tried to understand the magic of written words. Where, they asked, does the meaning come from? In 1908, Huey wrote:

> And so to completely analyze what we do when we read would almost be the acme of a psychologist's achievements, for it would be to describe very many of the most intricate workings of the human mind, as well as to unravel the tangled story of the most remarkable specific performance that civilization has learned in all its history. (Huey, 1908, p. 6)

Since Huey's time, other writers have attempted to explain the reading process. "Reading is thinking", declared Thorndike in 1917. And in the years since that declaration, many other writers and investigators have held the position that the process of reading and the process of thinking are ultimately the same.

Yet the basic questions, which appear to be essential to the effective teaching of reading remain unanswered: What is reading? Where does the meaning come from? What is comprehension?

Of course, it would be incorrect to assume that teaching students to comprehend what they read is impossible without a complete understanding of the process of comprehension. It does seem reasonable to assume that the teaching of reading comprehension would be greatly improved if the underlying mental and physical processes were more clearly understood. Many investigators are presently working toward that understanding. Whether or not such research is eventually successful, teachers must face the dilemma of attempting to teach comprehension without a clear understanding of how it takes place.

Earlier sections of this book deal with the comprehension of words and of sentences. In this chapter, we turn to the comprehension of passages. In view of the foregoing discussion, which holds that comprehension processes are, at best, but dimly understood, how are we to help teachers to improve the teaching of comprehension? A possible approach was suggested by an unlikely source.

The foreign visitor at our school was undergoing the ritual interview by reporters from the student newspaper. Everything was operating smoothly as our guest responded patiently to the inevitable questions: "How do you like our country? What are your impressions of our school? What is school like in your country? etc." Things went smoothly, that is, until one of the young reporters asked, "What's your favorite color?"

The visitor, taken aback and looking rather puzzled, asked, "Color of what? I do not understand your question. I have no favorite color. I prefer different colors for different things. I have a black car, but I would not like to live in a black house. I prefer that the sky should be blue, snow should be white and grass and trees should be green. No, I do not think I understand the purpose of your question."

We think the visitor's response is a fair one, and it points out a useful distinction to be applied to the question: What is comprehension? A justifiable response could be, "Comprehension of what?" or "Comprehension for what purpose?" And from this bit of reflection, we might add, "How much is needed?"

In the rest of this chapter, we will deal with the comprehension of passages in terms of these three questions:

1. Comprehension of what?
2. Comprehension for what?
3. How much is required?

For each question, we will discuss possible answers, examine the implications for reading instruction and offer some suggestions that may be used by classroom teachers to help students improve their comprehension skills.

Framework of Comprehension Purposes

To facilitate our discussions of the three questions dealing with the comprehension of passages, we have revised the "Conceptual Framework of Purposes", originally developed by Smith as part of her research (1967, pp. 60-61). Our revised version is presented in Figures 1 and 2. It must be emphasized that this framework is not intended as a model of the process(es) by which passages are comprehended.

Figure 1.

CONCEPTUAL FRAMEWORK OF WRITERS' PURPOSES

Figure 2.

CONCEPTUAL FRAMEWORK OF READERS' PURPOSES

Readers' Primary or Life Purposes for Reading
1. Intellectual demands
2. Enjoyment
3. Utilitarian purposes
4. Socio-economic demands
5. Vocational or avocational demands
6. Personal, social needs
7. Problem solving
8. Spiritual or religious needs; personal stimulation
Readers' Secondary Purposes for Reading (School Objectives Related to Comprehension and Rate)
Bases
1. General impression or general idea related to:
2. Details
3. Main Idea
Dependent upon readers' skill with bases
4. Sequence (time, space, ideas)
5. Direction (to be followed)
6. Comparison
7. Cause and Effect
8. Generalizations; conclusions
Anticipation of ideas; prediction of outcome
Characterization; description
Mood, tone
Sensory imagery
Fact and opinion; reality and fantasy
(Interrelated with any or all of items 1 - 8)
Literal or Inferential Meanings
Techniques Used in Reading for Any or All Secondary Purposes
1. Getting meaning from thought units of increasing length
2. Locating information effectively
3. Using author's aids to obtain meaning related to one's purpose
4. Selecting information for one's purpose
5. Organizing and recording what one has read
6. Analyzing and/or re-organizing content
7. Evaluating information
8. Relating one's personal experience to what is read or vice versa
The extent to which these techniques are used depends on such factors as:
1. Intensity with which the reader wishes to pursue the topic
2. The amount to be retained
3. The use which the reader will make of the content
4. The reader's prior knowledge and experience relevant to the subject

In its present form, the conceptual framework may be useful, we believe, for the following reasons:

1. It presents a meaningful and comprehensive matrix within which to coordinate the development of comprehension skills.
2. It should serve as a strong reminder that comprehension is greatly affected by the reader's and the writer's purposes.
3. Since it is easily adaptable to a wide variety of instructional approaches, it may be useful in curriculum planning in the selection of aspects of comprehension to be placed in scope and sequence.
4. It may be used to select areas of comprehension instruction to be tested in classroom research.
5. Teachers at various levels and in separate content areas may use the framework to locate their areas of concern, to generate questions and to devise learning environments and teaching strategies.

Question 1. Comprehension of What?

Types of Passages

All reading material beyond the word and sentence level is included at the passage level of comprehension. And it is a bewildering array. Consider the variety that confronts a reader: paragraphs, chapters, units, sections, articles, books and stories. Literary types to be comprehended include textbooks, novels, essays, reports, journals, poetry, drama, periodicals, etc. If each one had to be learned from the beginning, it would be hopeless. However, with certain exceptions, all the types of literary passages that a reader is likely to encounter are built from the same set of blocks: paragraphs.

Paragraph Comprehension

An extensive amount of instructional material is available for teachers to use in helping students learn about the basic elements of paragraphs: main ideas, details and transitional words or phrases. It would be a rare Language Arts textbook that did not include material about paragraph elements. Yet it is our experience that many students experience much difficulty in this basic and very important reading skill.

In addition to whatever instruction your text may present to help students learn to analyze paragraph components, we offer two suggestions. First, you should know that example paragraphs included in textbooks and workbooks are usually constructed or selected to be clear-cut examples. Get in the occasional habit of asking students to identify main ideas and details in nontext materials. Let students compare their findings and discuss their differences with the intent of resolving them. The aim is to have students become conscious of the analytic process of seeking to distinguish between main ideas and details and to become familiar with a wide range of transitional words and phrases *in their natural settings.*

The second suggestion for helping students develop their paragraph reading skills deals with basic patterns of paragraph development. Students need to learn that writers, for a variety of reasons, do not always put the main idea or the topic sentence at the beginning of each paragraph. For emphasis, for stylistic reasons, for balanced logic or for many other reasons, writers use basically five paragraph patterns. As designed by Gilbert (1959, pp. 46-47), the five types of paragraph patterns may be described as follows:

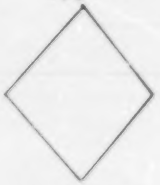
Type 1

In Type 1 paragraphs, the topic sentence comes first. The diagram for this type of paragraph is a triangle with apex pointing downward. Since the central idea stands at the head of the paragraph, the base line of the triangle is drawn at the top. As the paragraph tapers off with details, the triangle tapers off to a point.

Type 2

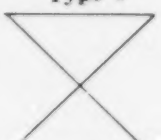
In Type 2 paragraphs, the topic sentence comes last. Therefore, the base line of the triangle is drawn at the bottom.

Type 3



In Type 3 paragraphs, the writer begins and ends with examples. Since the main idea is embedded in the middle, the diagram resembles a diamond.

Type 4



Sometimes an author chooses to split the main idea to signal a shift in thought. Sometimes an author will state one idea at both the beginning and the end of a paragraph in order to emphasize it.

Type 5

In Type 5 paragraphs, no main idea is stated. All the sentences contribute, and the reader must infer what the main idea is. Since no one sentence takes the lead, a good diagram looks like the one at the left.

After students have gained some experience in classifying paragraphs according to these five types, an interesting and productive activity for them is to try to determine habitual paragraph patterns used by specific writers. Most writers, either consciously or unconsciously, seem to fall into a pattern of favoring

one of the paragraph types. Besides gaining practice in locating main ideas and details, students will be quick to note the obvious advantage to themselves if they become familiar with a specific textbook's paragraph style.

Narrative vs. Expository Style

Teachers are frequently heard to complain that their students seem unable to learn from their textbooks, and that to be sure that their students understand the content material, they must orally repeat in class what students should have learned from reading their textbooks. We believe that one of the major sources of this difficulty is to be found in a comparison of narrative and expository writing.

Nearly all of the material in beginning reading textbooks is narrative in style. That is, children learn to read *stories*. Almost unconsciously, the young readers come to know that reading material is organized like a story, with a beginning, a middle and an end. Later, they learn more formal terminology for this plot sequence—opening or initial incident, rising action, climax and resolution.

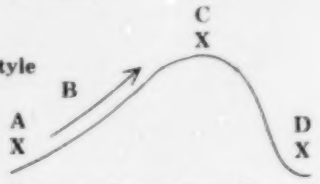


Figure 3. Narrative Style
A = Initial Incident
B = Rising Action
C = Climax
D = Resolution

This pattern is repeated over and over throughout the beginning stages of reading instruction until it becomes an ingrained habit for pupils to expect that a story will begin, some things will happen and the story will end (usually on a happy note).

However, when the young learners are shifted without warning to expository writing and expected to learn from it, they are unprepared to cope with the organizational pattern. It is not unusual to notice that interest and enthusiasm for learning begin to wane about the time that young students are expected to learn from reading their content area textbooks.

Expository writing is usually ordered in a logical, deductive format. A content textbook, written in expository style, is about one major subject area. It is divided into sections or chapters, each of which presents one broad aspect of the major subject. Within each chapter, subtopics are ordered carefully, usually in deductive fashion with subheadings in bold-face type.

If a writer is to succeed in his/her purpose for writing, s/he must aim to be understood. Writers normally do not write to confuse their readers. In fact, they spend considerable time and effort in organizing their writing so that a reader can follow the line of thought. However, young readers must become acquainted with major organizational patterns in writing if they are to be able to take advantage of the textual aids supplied by the author.

A brief comparison of some of the differences between narrative and expository styles of writing should suggest some of the more troublesome areas for young readers who are making the transition from learning to read to reading to learn:*

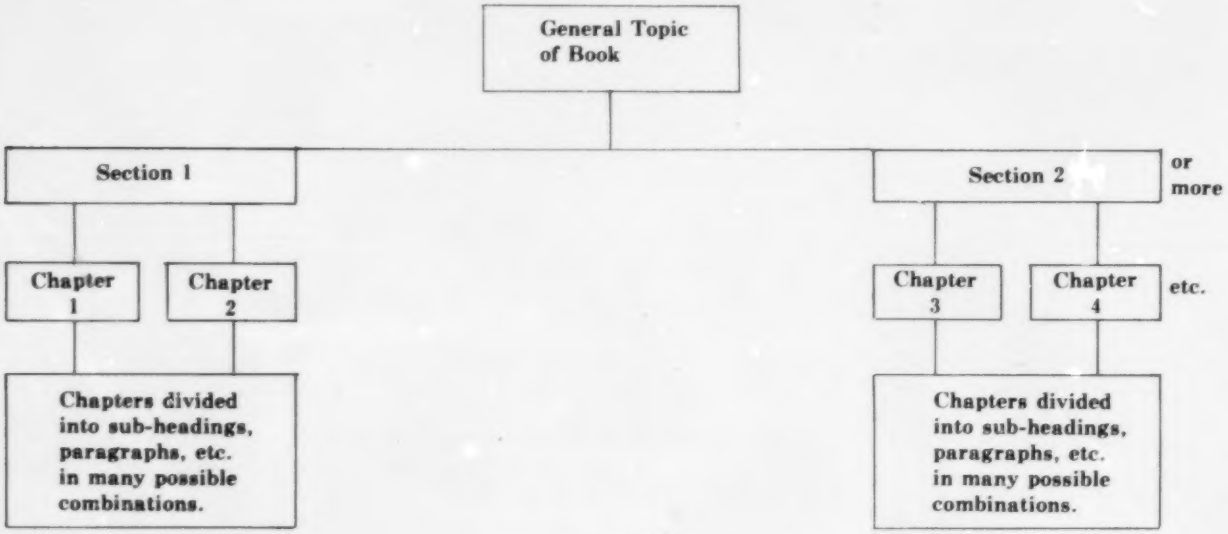
Narrative Style

Catchy titles, usually employing personal reference and action verbs. Sometimes even dialogue and humor.

Compelling topics relating to reader's background or experience or fantasy life.

Plot - sequential: purpose, problem, solution.

* Items on this list were selected as pertinent to this discussion from those presented in a lecture by Dr. Ken Dulin, University of Wisconsin, October 24, 1972.



Imaginative story line: hints, clues, figurative language.

Many concrete details, word pictures, imagery.

Personalized, human characters - often same age as readers.

Expository Style
Label-type titles, usually topical in form.

Abstract, generalized topics. Rarely light or humorous. Usually not related to reader's experience.

Deductive order of presentation: general to specific.

Imbedded outline: boldface headings, subheadings, transitional cue words.

Much abstraction. More concern for scholarly accuracy than for ease of reading.

Relatively impersonal adult characters, if any at all.

Of course, there are many other differences which could be noted, but this list is sufficient to make the point. Many young readers are simply not aware of these basic organizational differences between narrative and expository writing. All they seem to know is that reading "just isn't as much fun anymore". As Pratt notes, "Any consideration of children's purposes for reading should involve a sharp distinction between narrative and expository writing," (1968, p. 2).

To completely answer the question "Comprehension of what?" would involve a lifetime of reading, sorting and classifying the seemingly endless types of of reading material, each requiring a slightly different or radically different approach. An obvious implication of this fact is that comprehension of passages is not some one thing. A reader's comprehension of passages is strongly influenced by an author's purpose and by his/her use of the elements of writing.

Question 2. Comprehension for What? Readers' Purposes for Reading (Primary or Life)

"Reading is useful in money-making, in the acquisition of knowledge, in the management of a household and in political life," noted Aristotle. A few lines later he added, "Children should be instructed in reading (and writing) not only for their usefulness, but also because many other sorts of knowledge are acquired through them. . . .To be always seeking after the useful does not become free and exalted souls," (*Politics*, Book 8).

In the 2000 years since Aristotle's observation, the reader's purposes for reading show remarkably little change, as a glance at the "Conceptual Framework of Readers' Purposes" will reveal. (See figure 2.)

It is our contention that reading instruction should be planned with these life goals in mind. Every student should be led (or pushed) as far along the road to reading maturity as he is capable of traveling. Why? Because a mature reader is one who is able to use reading as a matter of course for an immense variety of life-purposes. Obviously, the greater a reader's skill, the greater will be his/her reward. Put simply, the more one learns, the more one is able to learn.

However, beginning readers and numbers of immature and/or disabled readers may be unaware or unable to avail themselves of the luxuries afforded by maturity in the higher-level reading/thinking skills.

Here are three activities that can be used to help both teachers and students gain insight into primary or life purposes for reading. Many other activities are possible. These are suggested merely as "openers".

1. In an open discussion session, have group members identify as many "real-life" reading tasks as they can. Record each one on the chalkboard. Then, give each group member a list of the eight primary purposes from the conceptual framework. Have them sort the items from the board into the eight purpose-categories. Were there any leftovers?
2. Display a collection of books, magazines, pamphlets, catalogues and brochures in the classroom. Have class members decide which primary or life purpose for reading each item might help to fulfill.
3. Bring an assortment of newspapers to class. Have class members find items and features for each of the primary purposes. Discuss the variety of purposes for reading which newspapers fill.

Readers' Secondary Purposes for Reading (School Objectives)

We believe that a major problem in the effective teaching of comprehension of written passages is due to the failure to connect school purposes for reading with life purposes for reading. How often have you observed, as we have, sullen students subdued by seatwork, conducting meaningless searches for main ideas and dreary details? Beyond our personal observations, there is some research evidence to support our belief.

In a study of the use of purposes in reading, Smith (1967) listed these findings:

1. Good readers were more able than poor readers to choose an appropriate purpose for reading.
2. The majority of the subjects did not remember having been taught how to read for different purposes.
3. Teachers set the purposes for reading largely through the questions the subjects thought they might ask or the examinations they might give.

4. The subjects. . .showed little insight concerning the variety of purposes for which one can read.

If reading instruction in the higher-level reading/thinking skills is to be made more effective, it must become more closely related to pupils' own primary purposes, and students must become aware of the variety of purposes for which they read.

In the following statement made by Pratt (1968, p. 2), we note one of the most significant features of the "Conceptual Framework of Readers' Purposes":

If thought is to occur in association with reading the child must do more than name words and apply appropriate expressional groupings. Thinking must be stimulated by concern on the part of the reader. This concern on the part of the reader is commonly called *purpose* in most materials related to reading instruction. Thought is stimulated by the child's own purpose, not by an artificial one imposed by the teacher. The teacher may identify a purpose and lead him to accept it, but until a child makes it his own purpose, it will not be the stimulus that triggers thought.

To our way of thinking, one of the most significant features of the "Conceptual Framework of Readers' Purposes" is the manner in which it displays the separation between Readers' Primary and Secondary Purposes for Reading, or the gap between *school* and *life* reading. A pupil who asks, "How come I hafta read this junk?" is probably signaling that he is unaware of any link between reading and the rest of his life. The teacher's purpose is not automatically the student's purpose.

To provide you with some specific ways of helping teachers and students to better realize the connections between *school* reading and *life* reading, we have selected a number of "starter" activities. You may adapt them freely to various grade levels and content areas, as you wish. Most of the suggested activities require no special equipment or materials beyond those readily available in most classrooms. The activities are "open-ended", in the sense that you can do as little or as much with them as seems appropriate to your situation. Finally, the suggestions are not intended to be followed to the letter; you are, in the final analysis, limited only by the far-reaches of your talents as a creative teacher.

1. *For Real*
   Locate reading materials from nontext sources and devise activities around them. For example:
   a. Read, write and carry out how-to-do-it instructions for model building, sewing, cooking, constructing craft items, etc.
   b. Read advice columns in newspapers and discuss the soundness of the answers.
   c. Discuss school, community, state and/or national problems and issues. Gather and read materials to become informed. Take sides on the basis of evidence located in the readings.
   d. Prepare programs of oral readings for younger children. Nursery rhymes, fairy tales and familiar favorites from children's literature. Be sure to confer with students on selection policies, rehearsal procedures and standards of quality for "public" performances.
   e. Occasionally let students make up test items which may actually be included in examinations upon materials they have read. If and when you discover talented testmakers in your classroom, have them share their secrets with other class members.
2. *Make-Believe*
   As important as "real-life" activities are excursions into fantasy, roleplaying and creative dramatics. The list of possibilities is literally endless, and many fine methods texts, kits and materials are available. But don't underestimate your students and yourself. Devise your own fun. Remember the magic power of the words *what if* . . .
   a. Using simple props and items from daily newspapers, produce a local news, weather and sports report. Your program can be done elaborately with video-tape equipment if it's available, or it can be done simply with a cardboard box in the shape of a camera placed on the back of the teacher's rolling chair. Be sure to write commercials and create visuals for them, as well as for the news, weather and sports segments. Share your program with another class.
   b. Learn to paint word pictures in the mind's eye of your listener. Locate or write your own selections that appeal to various senses. Elaborate this activity by planning a full-scale advertising campaign for a new product. Share informally with other classes.
   c. Name a new cereal and describe its taste. Compare your descriptions with printed information on cereal boxes.

Activities to Help Students to — seek, find, set, adopt, invent — Purposes for Reading

d. What would it be like to have the eyes of an insect? Gather information about insects' eyes from the library.
e. Plan to conduct an expedition to the North Pole. What must you know before you leave? How can you find out?
f. If a television network gave you two minutes of prime time, what would you say or do?
g. What would life be like at the center of the earth? On the moon? In an ant hill? Read widely. Share information. Locate differences in the various materials about the same subjects.

3. *Who Learns the Most?*
"Who learns the most in any classroom?" goes the old question. "The teacher, of course," is the time-honored answer.
a. Distribute comprehension passages from a reading kit to each member of the class. The levels should be approximately those of your students. Tell them to find out what the passage is about in order to tell the other members of the class about it. Ignore the comprehension questions that accompany the passages. Make the student's purpose immediate and real. He has to *find out* what's in the passage to *tell* the others.
b. Divide the class into small groups of three or four students each. Charge them with the responsibility of some aspect of a forthcoming lesson. Give them the materials and a pat on the back, telling them that you are sure they can really get through to the class, even if you can't.
c. If arrangements are possible, let older students have the experience of teaching a lesson or two to a group of younger students. Afterwards, be sure to let them describe their feelings and their insights to the other class members.
d. When you discover a student who has a highly developed interest in a hobby, sport or unusual subject, let that student teach the others about it. Assemble printed materials pertaining to the special topic ahead of the teaching session. Let your classroom "expert" advise you on selection of materials. What about a post-test?

4. *Unsorted Ideas*
a. Have a corner collection of reading materials not usually used to teach reading: empty cereal boxes, old junk mail, travel folders, cookbooks and recipes, TV Guides, almanacs, maps, greeting cards, magazines, record jackets, shop manuals, catalogues, etc. In short, anything that is likely to be read by your students. Use those odd moments at the end of class periods and after lessons and tests are completed to let your students "waste" their time in the corner collection of reading clutter. Watch and listen to find out about student's special interests.
b. When students complain about having to do book reports, interrupt the assignment and challenge them, dare them to devise better ways of doing it. Evaluate all the ideas in a class discussion. Choose some and follow through.
c. Occasionally have a "read and relax" session for an entire class period. Everyone, teacher included, is to bring to class a favorite book or magazine and a light snack — an apple, some peanuts — that can be munched quietly as you read. Put your feet up and enjoy! But the deal is off if pupils forget to bring things to read, or if they do not settle down and really read during the period. Show them you enjoy it.

Activities to Motivate Teachers to Understand and Use Purpose-setting Activities in Their Teaching

You are probably aware of the old maxim that holds, "Teachers tend to teach the way they were taught." It is a useful idea for this section of our discussion. In-service sessions that are imaginative and that provide "hands-on" working, doing activities of practical and immediate application are probably the best.

1. Have teachers become familiar with the "Conceptual Framework of Readers' Purposes" by discussing it with small groups of their colleagues after they have had an opportunity to read and think about it.
2. Hold a "Buzz Session" about the "Framework" and record *all* ideas, questions and comments about it. Some areas for questioning might be these:
   a. What other purposes for reading might have been included?
   b. What aspects of the "Framework" do teachers find to be most useful? Most troublesome? Important? Pertinent?
   c. Do some aspects of the "Framework" seem more appropriate to particular content areas or grade levels?
3. Gather ideas from teachers on how to translate any specific items from the "Framework" into specific learning activities. Encourage them to try out their ideas.
4. Have teachers discuss their own purposes for reading. What books would they cite as having the most significant impact upon their lives?
5. Try out some of the reading activities

suggested for students in the preceeding section with the teachers. This can be done at two levels of involvement. Have them respond to the activities as themselves or as if they were their own students.

Question 3. How Much Comprehension is Required?

Levels and Extent of Comprehension

It seems obvious that as readers go about various reading tasks, switching from purpose to purpose, they will also vary in the intensity of the motivation to comprehend. Such variation in the reader's motives for reading is likely to account for varying levels of comprehension, other things being equal. It may be that many young readers are unaware of the variable nature of their comprehension ability. Smith's study, referred to earlier in this chapter, pointed out weaknessess in students' abilities to set purposes for their reading. (Smith, 1967) Her study concluded that instruction in purposeful reading should continue throughout the school years so that students can become proficient in reading materials of increasing difficulty for different purposes.

Intensity with Which the Reader Wishes to Pursue the Topic

We know of no scale by which to assess the degree of intensity with which a reader pursues a topic. We have observed, however, that there does seem to be variety in readers' motivation to get at the meaning of various reading materials.

We would urge that classroom teachers discuss this phenomenon with their students. Students could be asked to give examples from their own reading experiences. Some students will probably tell about times when they were so deeply immersed in their reading that they did not respond to a parent's summons. Many other students will probably be astonished to learn that anyone could be that deeply involved in a book. Differences will undoubtedly range from extreme intensity at frequent intervals to no involvement ever. Pupils could be advised to assess their own reading intensity levels when reading for various purposes and at different times.

The Amount to be Retained

If a reader knows that s/he will be tested on a piece of reading material, s/he will most likely attempt to apply the highest reading skills that s/he possesses. Contrast this situation with a reader who is scanning the headlines in the morning newspaper. Unless s/he sees an item of particular interest, his/her level of recall will probably be much lower than the student preparing for an examination.

Again, the classroom teacher could help students to become aware that varying one's reading techniques to adjust to the amount of material to be retained can be a conscious decision of the reader. All material need not be read at the same rate nor for the same amount to be retained.

The Use Which the Reader Will Make of the Content

Is the material to be memorized for a speech? Is it to be used as evidence in a debate? To remember some facts? To pass a quiz? To learn how to do something? To enjoy? Many uses of reading can be drawn from a class discussion. The teacher will want to point out that a reader's application of specific reading techniques can be consciously varied to suit specific reading purposes.

The Reader's Prior Knowledge and Experience Relevant to the Subject

If a reader is highly knowledgeable about a subject, s/he will be able to read new material much more rapidly than someone who has little or no knowledge about it. Also, a reader who is thoroughly familiar with a subject will be more likely to be sensitive to new ideas about that subject when s/he encounters them in his/her reading.

Young readers can be encouraged to use their prior knowledge and experience to better comprehend what they are reading. Nearly every study skills system contains a survey step in which readers are advised to take time before reading a selection to note the title, headings, subheadings and illustrations. As they conduct this preliminary survey of the material to be read, students should also be searching their memory stores to relate their old learnings to the new information. Teachers can facilitate this survey process by asking pertinent questions prior to any selection that is to be read by the class. Occasionally, the teacher can ask students to formulate the questions to be asked.

It has been our experience that although many reading and study skills methods texts deal with purpose-setting as a valuable adjuct to reading comprehension, it is a practice often neglected in the classroom.

Summary

The answer to the question, "What is reading comprehension?" is "Comprehension of what, for what purpose and how much is required?"

Comprehension of passages is not some one thing. Many forces affect what and how a reader comprehends. We have seen that meaning is not in words alone, nor is it in the grammatical elements of sentences alone. Meaning is, for the most part, in the mind of the reader.

We have tried to show that reading comprehension is determined by several factors: the writer's purposes, the writer's skills, the format of the materials, the reader's purposes, the reader's skills and the reader's knowledge and experience.

We believe that teachers at every level and in every subject area of the curriculum must so design their instruction that pupils become lifelong readers who have acquired the habit of seeking meaning and purpose in what they read.

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Smith, Richard J. and Barrett, Thomas C. *Teaching Reading in the Middle Grades*. Reading, Massachusetts: Addison-Wesley, 1974.

ADDITIONAL READING

DeChant, E.V., and Smith, H.P. *Psychology in Teaching Reading*. Englewood Cliffs: Prentice-Hall Co., 1977.

Though intended primarily as a college text in reading, this book serves as useful professional reading for practicing teachers wishing to consider in a fairly broad fashion the implications of research and theory in psychology for the teaching of reading.

Moffett, J., and Wagner, B.J. *Student-Centered Language Arts and Reading, K-13*. Boston: Houghton Mifflin Co., 1976.

In this work, the authors propose a comprehensive plan for the development of all language producing and consuming skills — including reading. Premised heavily upon the important role of oral language in the development of literacy skills, the authors review important work in developmental psychology, by J. Piaget and L. Vygotsky, then offer an approach to curriculum design built upon the relations of language and cognition.

The book includes many practical teaching activities intended to develop literacy skills.

"Reading. Language, and Learning". *Harvard Educational Review*, 3, 47, August, 1977.

This special issue of the HARVARD EDUCATIONAL REVIEW contains key papers by authors such as D. Olson, K. Goodman, Y. Goodman and F. Smith with book reviews by C. Cazdan and J. Chall. Examination of the relations between language generally and reading comprehension are explored. The Goodmans discuss 'miscue analysis' and its role in reading instruction. Further, various aspects of language development and relation of same to reading instruction are considered.

Smith, F. *Comprehension and Learning*. New York: Holt, Rinehart and Winston, 1975.

Building on his earlier work as elaborated in UNDERSTANDING READING and elsewhere, Smith, in this book, draws from major work in cognitive psychology and psycholinguistics to develop a comprehensive theory of learning generally with specific applications to reading as one key learning area. Reading comprehension is treated as an important thinking and cognition process which must be viewed with a far more comprehensive perspective than we often do.

Smith, F. *Understanding Reading*. New York: Holt, Rinehart and Winston, 1971.

This work by F. Smith is one of the first to apply major new insights in developmental psycholinguistics to the development of new approaches to reading. Smith examines the mental processes involved in the reading act, then makes a number of specific applications to reading.

Though a sophisticated examination of the area of reading, it is not overly technical in content or style.

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